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A CONSIDERATION OF THE FASCIA OF BROAD LIGAMENT WITH RESPECT TO CERTAIN SURGICAL PROCEDURES ON THE PELVIS*

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In the past, many gynecologists have described successfully the ramifications of the pelvic fascia and depicted its relationship to various reconstructive operations on the pelvic organs. There are, however, certain features of the fascia of the broad ligaments and the cardinal ligaments which have not been stressed sufficiently or else have been overlooked. These features are related definitely to the question of total versus subtotal hysterectomy and to the surgical management of the prolapsed cervical stump. For purposes of accuracy and clarity, the anatomic characteristics of the structures of the broad and cardinal ligaments will be reviewed briefly.

ANATOMY

According to most anatomists, the broad ligaments pass from the sides of the uterus to the lateral walls of the pelvis. Together with the uterus, they form a septum across the female pelvis, dividing that cavity into two portions. The bladder is contained in the anterior portion; the rectum and, in certain conditions, certain coils of the small intestine and a part of the sigmoid colon are contained in the posterior portion. Between the two layers of each broad ligament are contained; (1) the uterine tube superiorly, (2) the round ligament of the uterus, (3) the ovary and its ligament, (4) the epoophoron and paroophoron, (5) connective tissue, (6) unstriped muscular fibers and (7) blood vessels and nerves. In addition to the broad ligament just described, there is a band of firmer tissue just below, and continuous with, the fibrous tissue of the broad ligament, designated as the "cardinal" or "Mackenrodt's ligament." This ligament extends from the lateral bony pelvic wall and is attached to the side of the uterine cervix and to the vault and lateral fornix of the vagina.

I[1] stated five years ago that considerable emphasis had been given to the supporting power of the round ligaments, broad ligaments and uterosacral and uterovesical ligaments. I believe, however, that if the anatomic relationship of these various structures to the uterus and bladder were investigated it is doubtful whether they would be proved to offer any support to the uterus. Viewed from the abdominal aspect, the round ligaments always rest on the broad ligaments (fig. 1) and are freely movable. The upper portions of the broad ligaments are merely folds of peritoneum which can be moved freely from side to side, and forward and backward. The uterosacral and uterovesical ligaments are composed of folds of peritoneum and connective tissue and become fixed only when inflammation is present. Furthermore, after all of these ligaments have been divided surgically (fig. 2) in the course of abdom-

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Fig. 1. Normal position of female pelvic organs.

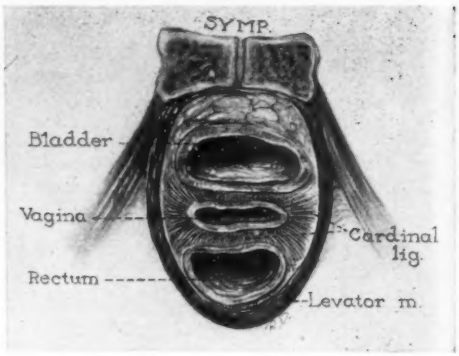

Fig. 3. Transverse section of pelvic fascia through bladder, vagina and rectum just in front of cervix.

inal hysterectomy, the uterus still does not prolapse, since it remains fixed in its normal position by the lateral masses of connective tissue of the parametrium, which, in turn, are attached to the sheaths of the vessels and the bony pelvis. It becomes apparent that the principal tissues which maintain the uterus in its normal position in the pelvis are these lateral masses of pelvic fascia and not the usually designated uterine ligaments.

A better understanding of the cellular pelvic fascia is derived from a study of a diagrammatic cross section just in front of the uterus, through the bladder, vagina and rectum (fig. 3) and a second coronal diagrammatic section directly through the uterus and vagina (fig. 4). The chief point of interest in figure 3 is that this pelvic fascia originates on the bony and muscular walls of the pelvis, and extends completely around the vagina and bladder. It continues also over the uterus which does not appear in this drawing. The density of this fascia varies from birth to old age. It is thickest at the points of greatest stress, which are around the cervix and beneath the bladder. During pregnancy it becomes thicker, pliable and tremendously vascular. During and after the menopause it atrophies, becomes devoid of adipose tissue, and loses much of its supporting power. The coronal section in figure 4 reveals the dense character of the cardinal ligament, its origin at the pelvic wall and its insertion about the cervix and upper portion of the vagina. It is more or less continuous with the lower margin of the broad ligament. The plexus of vessels and the ureters penetrate this fascia, and are protected by it. For example, the most fixed portion of

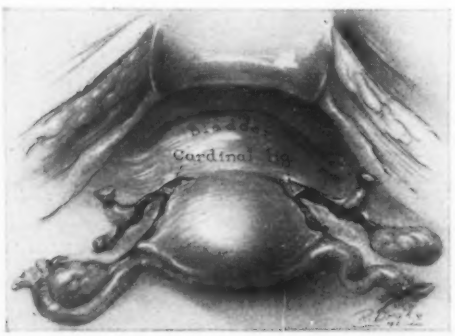

Fig. 2. View with all ligaments divided to expose pelvic fascia.

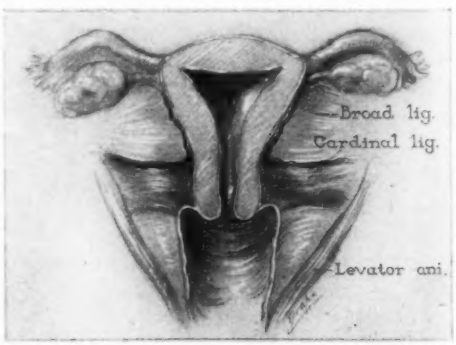

Fig. 4. Coronal section of pelvic fascia through uterus and vagina.

Fig. 5. Sagittal section of lower portion of adult female trunk. Note position of uterus. Inset: Sagittal section through pelvis of newborn female child.

the entire ureter is the ureterovesical juncture and this is surrounded by a continuation of this pelvic fascia. The correct explanation should be that this point is the dangerous region in regard to stress during parturition and the point most vulnerable to infection.

There is considerable shift in the pelvic fascia and organs from birth to maturity (fig. 5). In the newborn child the uterus is contained in the abdominal cavity and projects beyond the superior aperture of the pelvis. The cervix is considerably larger than the body of the uterus. The pelvic fascia is thickened at the points of attachment where stress ultimately will be exerted around the cervix and the rectovesical and rectovaginal walls. At puberty (fig. 5) the uterus has become pyriform and normally weighs from 14 to 17 gm. It has descended into the pelvis, assumed an anteversion position and often appears to be supported by the bladder. This, however, is an erroneous conception. Nature never intended that one organ should support another, but a specific supporting structure is provided for each one. This structure is sometimes congenitally faulty and permits abnormal positions of the organs. This is true of the uterus in approximately 20 to 30 per cent of females. However, these same females may have faulty long mesenteries of the stomach and kidneys which produce a state of ptosis. In such cases, it is no more necessary to correct surgically a movable uterus than it is necessary to perform nephropexy or gastropexy. Surgical procedures on the uterus are necessary only when fixation occurs from some inflammatory process; surgical procedures on the kidney are necessary only when it fails to empty properly or pyelectasis, which is rare in a movable kidney, develops. The pelvic fascial attachment around the cervix, which maintains the uterus in its normal position, extends higher on the anterior wall than on the posterior. In addition, the fascia becomes thickened in the rectovaginal and rectovesical regions undoubtedly in order to protect the bladder and rectum during parturition.

FACTORS WHICH DETERMINE TYPE OF PROCEDURE

Since the supporting and protecting character of the pelvic fascia seems to be established beyond doubt, it should be the one factor which determines whether total or subtotal hysterectomy should be performed. Among nulliparas, there is approximately an 80 per cent possibility that the cervix will remain in its normal position if subtotal hysterectomy is performed, since its fascial attachments have not been disturbed. This may also be true of women who have had one or more children, but it is the exception rather than the rule. If subtotal hysterectomy is performed in cases in which the cardinal ligaments have been stretched or torn to such a degree that they cannot maintain the proper lateral tension on the cervix, it will begin to sag in the pelvis and, eventually, prolapse. A partially prolapsed stump and cystocele will produce troublesome symptoms. Many operations have been devised on the broad and round ligaments in order to support the cervix properly. The majority of these operations are time consuming and faulty from an anatomic viewpoint.

Total hysterectomy requires complete separation of partially torn cardinal liga-

ments from the cervix and a further division of the uterosacral and uterovesical portions of the pelvic fascia. After removal of the uterus and cervix, the lateral cardinal ligaments may be shortened to any desired tension and then reattached to the lateral angles of the vaginal vault, where they had been attached until they were torn off by trauma at parturition. The stumps of the broad ligaments, if pulled laterally, tend to elevate the vagina and to shorten further the cardinal ligaments by bringing them nearer their points of origin. If the vaginal vault is supported in this manner, it cannot possibly prolapse, since the parts have been restored to as near normal as possible.

Shortening the vagina has been considered a deterrent to total hysterectomy. If there is an adequate anterior and posterior vaginal fornix, the vagina actually may be lengthened rather than shortened by utilizing this extra vaginal mucosa by a process of evaginating the cervix by traction after dividing the uterovesical and uterosacral folds of the pelvic fascia.

Intra-abdominal hemorrhage has been noted as a cause of death subsequent to total hysterectomy and has been offered as a deterrent to the procedure. This complication is prevented by inverting the cut edges of the vagina so that if bleeding occurs, it will be into the vagina and not into the abdomen. Bleeding from the vaginal vault is controlled promptly by immediate application of a curved forceps on the bleeding point for forty-eight to seventy-two hours.

TECHNIC OF TOTAL HYSTERECTOMY

The vagina is cleansed thoroughly with soap, water and alcohol, and then is painted with tincture of merthiolate. The cervix may or may not be closed except in performance of the operation for carcinoma of the fundus. Tincture of merthiolate is used for painting the abdominal wall. When the patient is completely draped the Trendelenburg position is assumed. Complete, relaxing anesthesia is desired.

A low midline incision extending from the symphysis pubis to the umbilicus is sufficient. A warm, moist, gauze pack is used to retain the intestines. The right round ligament is divided between forceps, thus opening the broad ligament. If the tube and ovary are to be removed, the ovarian ligament is divided near the bifurcation of the iliac vessels. If the adnexa are to be retained, the ligament is divided near the uterus and retracted. The anterior and posterior peritoneal coverings of the broad ligament then are divided further, thereby exposing the deeper fibrous portion of this ligament and the attachment of the cardinal ligament. These ligaments, including the uterine and cervical vessels, are divided between clamps close to the vagina and cervix after the bladder has been pushed forward carefully. This same process is repeated on the opposite side. While upward traction is maintained on the uterus, the uterosacral and uterovesical folds are divided; this procedure permits the vagina to be extended 1/2 to 1 inch (1.3 to 2.5 cm.) (fig. 6). The vagina is opened posteriorly and completely cut away from the cervix. The edges of the vagina are held by four tenacula. A running mattress suture of no. 1 chromic catgut closes the vagina by inverting the cut edges (fig. 7,

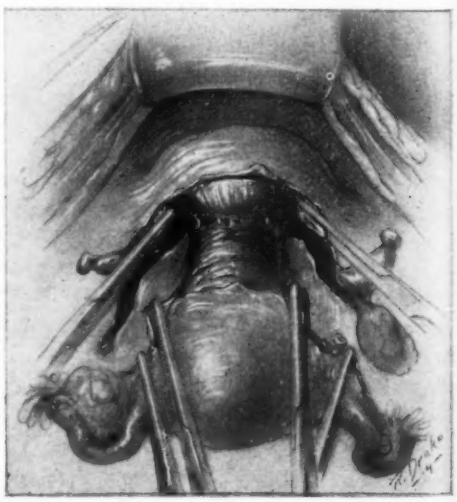

Fig. 6. Division of uterovesical fascia and lengthening of vagina.

upper left). A second suture is placed over this one. The uterine vessels included in the cardinal ligament and lower portion of the broad ligament are now tied by a double stick tie of no. 1 chromic catgut. The vaginal wall is picked up in this suture well away from the ureter, and as the suture is tied, the cardinal ligament can be pulled mesially, thereby shortening it as it is tied (fig. 7, upper right). The same procedure is carried out on the left side. The round ligaments next are adjusted to the vaginal vault on each side (fig. 7, lower left), with only sufficient tension to pull the cardinal ligaments slightly laterally for a temporary period. As the tissue heals, the ligaments are shortened further and thus adequate tension on the vault is maintained. Peritonealization (fig. 7, lower right), is completed by inverting the ovarian stump on the right and left sides. When the adnexa have been retained, the ovarian ligament and all its vessels are retracted upward close to the bifurcation of the common iliac vessels. There the ovarian stump is inverted, which permits the ovary to hang freely without any tension. Any undue tension will produce thrombosis of the vessels in the mesentery and subsequently atrophy or cystic disease of the ovary.

PROLAPSED CERVICAL STUMP

From the preceding paragraphs, it is apparent that if subtotal hysterectomy

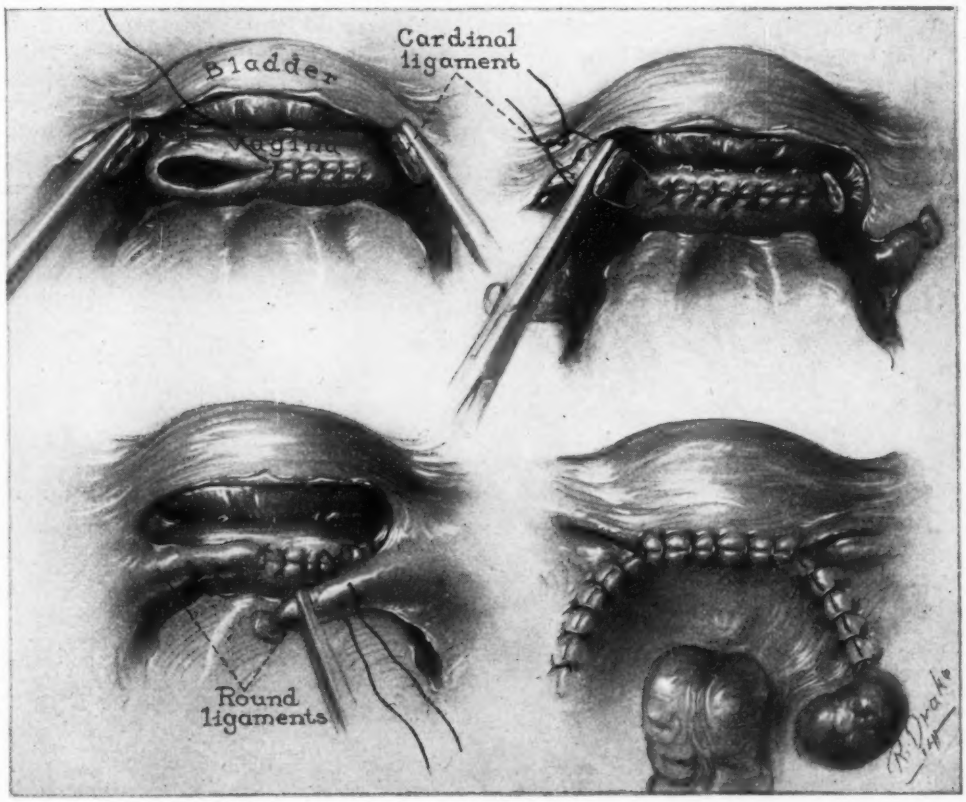

Fig. 7. Upper left, inversion of cut edge of vagina; upper right, ligation of cardinal ligament and reattachment to angle of vaginal vault; lower left, attachment of round ligament to vaginal vault mesial to stump of cardinal ligament; lower right, peritonealization of pelvis. Note width of vaginal vault and angles of support.

has been performed when there is inadequate support from the cardinal ligaments and lower segment of the broad ligament, moderate to complete prolapse of the stump of the cervix is a most likely possibility. A discussion of the management of this situation seems pertinent, as any form of plastic reconstruction centers about the availability and proper use of the remnants of the pelvic fascia.

Patients in whom surgical treatment of the prolapsed cervical stump is necessary may be divided into two groups, namely; (1) those in whom it is desirable to maintain the vagina and (2) those in whom it is not. In the first group it is often most difficult to obtain satisfactory results, but the vagina can be maintained if any remnants of the cardinal ligaments are available. The round ligaments may be retrieved and brought forward beneath the bladder to serve as a partial support for the bladder by attachment to the uteropubic fascia. As a rule, after the cervical stump is mobilized (fig. 8, left) there is sufficient tissue of the cardinal ligaments although greatly attenuated, to permit approximation in the midline of the vaginal tract following excision of the cervix. These opposed ligaments then are adjusted beneath the bladder by attachment to the fascia of the pubic rami on each side, leaving only sufficient room for the urethra. The peritoneum under the bladder is sutured to these ligaments. The bladder and urethra are well retained and it should be noted carefully that it is almost impossible to bring these ligaments tight enough under the urethra to obstruct the urethra. If the opposed ligaments are sutured in this fashion herniation of the bladder over these ligaments will not occur.

The next step in this procedure is to pick up the divided ends of the uterosacral ligaments and gently strip them from the rectum and adipose tissue sufficiently far back to permit accurate approximation in the midline (fig. 8, right). These are, in turn, sutured to the vaginal vault. These ligaments then tend to exert a constant backward pull on the vault. The

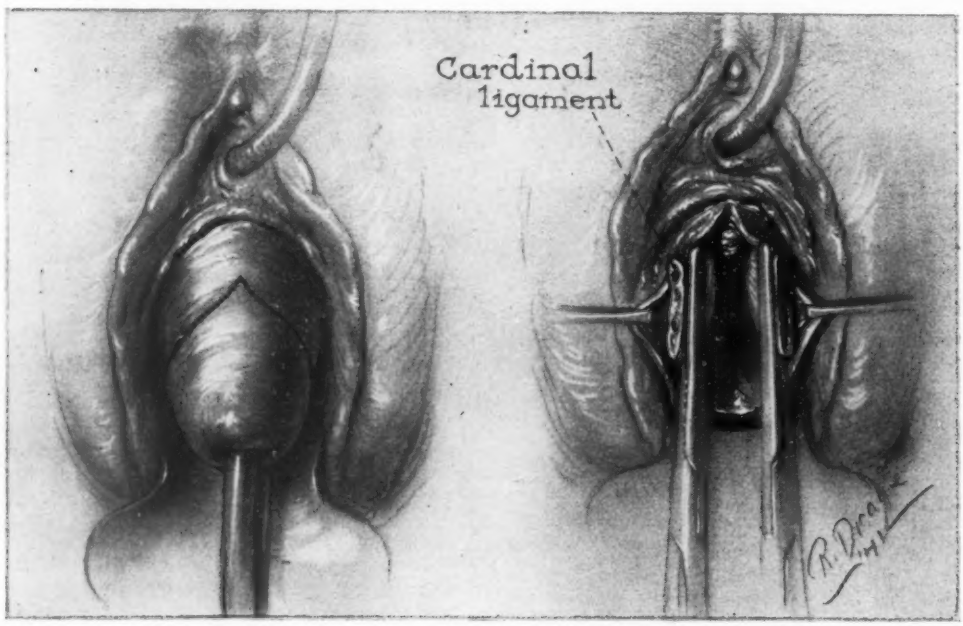

Fig. 8. Left, cervix extended; racquet incision; right, approximation of remnants of cardinal and broad ligaments.

mucous membrane of the anterior vaginal wall is now adjusted to these approximated ligaments, thus completing correction of the cystocele and fixing of the vaginal vault.

The reconstruction of the posterior vaginal wall in cases of colpocele, rectocele and relaxed perineum may be more difficult, but with patience and care it can be done. The procedure is best undertaken by splitting the vaginal wall posteriorly from the perineum to the vault and exposing the rectal wall and adipose tissue. To correct the colpocele effectively, it must be recalled that the pelvic fascia originally extended over the rectum beneath the vaginal wall and was fixed at the juncture of the uterosacral ligaments to the uterus. This fascia, which is now lateral to the rectum, must be grasped, brought together again over the rectum, and sutured to the approximated uterosacral ligaments. This suturing is continued over the rectum until the edges of the levator ani muscles are encountered. The perineum can now be reconstructed in the usual manner. The posterior vaginal wall usually is closed with a continuous lock stitch. The complete procedure is essentially the same as a Mayo vaginal hysterectomy with only slight modifications.

In the second group of cases, I favor vaginectomy with removal of the cervical stump. This is easily and quickly performed with little risk. The vaginal mucosa is separated from the bladder, the scar of the vault and the rectal wall. The remnants of the fascia constituting the triangular ligament and constrictor urethrae muscle are approximated beneath the urethra and neck of the bladder. The levator ani muscle is mobilized and the lateral edges are sutured together in the midline as high as the posterior margin of the triangular ligament, thus obliterating the vaginal tract. The bulbocavernosus muscle, or constrictor of the vagina, is superimposed over the levator ani muscles in order to cover the lower half of the outlet. Colles' fascia and skin are closed in the midline.

SUMMARY

The frequent faulty development of the pelvic fascia may be associated with other congenital defects. The importance of the pelvic fascia is stressed with particular reference to total hysterectomy and to surgical correction of prolapsed cervical stump associated with cystocele and rectocele subsequent to subtotal abdominal hysterectomy. When it is desirable to maintain the vagina the latter procedure is similar to a Mayo vaginal hysterectomy, with certain modifications. Vaginectomy is the operation of choice when it is desirable to occlude the vagina.

REFERENCE

1. Counseller, V. S.: Mayo vaginal hysterectomy for uterine prolapse and cystocele; indications and technic. South. Surgeon., 5:467, 1936.

DISCUSSION

Dr. O. C. Rigby (Shreveport): I feel that I am voicing the sentiment of the Louisiana State Medical Society, when I say that we have learned a great lesson in gynecologic surgery from the paper given by Dr. Counseller today. I heartily agree with him, that the stress which was once placed upon the round ligaments and broad ligaments was entirely overrated, by leading so many to believe that these ligaments had all to do in supporting the pelvic organs. How often have we seen, years later, some operation done, such as a subtotal hysterectomy with the round ligaments pulled across the stump and the ovaries pulled up to midline, later to be prolapsed, all because the uterosacral ligaments and cardinal ligaments had not been shortened and made to bear their part in holding up the pelvic floor. As has been shown, tightening the cardinal ligaments with the fascia from the uterosacral ligaments and the broad ligaments is a tremendous help toward maintaining the pelvic floor. Since it would seem better to leave the cervical stump, in order that it may help maintain the pelvic floor, I would like to call your attention to the fact that too many of these women develop cancer in the future. We have quite a few at the tumor clinic at the Charity Hospital now, where the subtotal hysterectomy was done and they now have cancer of the cervical stump. However, if a surgeon would do a complete hysterectomy, paying attention to the cardinal ligaments and the uterosacral ligaments, there is no reason why there should be a prolapse in the future; that is, taking for granted that there had been no laceration of the pelvic floor from childbirth prior to operation.

Dr. P. J. Carter (New Orleans): I would like to ask one question. I noticed that Dr. Counseller tied the cardinal ligament and uterine artery en masse. Do you think it is always better to tie en masse or separately?

Dr. P. B. Salatich (New Orleans): There is a point I think of importance which I am glad Dr.

Counseller stressed. That is to asepticize thoroughly the vagina before performing hysterectomy. I thing some physicians are lax in that.

I believe probably the reason a good many do not like to do a complete hysterectomy is because the mortality is higher. I do not think the mortality is any higher in complete than in subtotal. I feel this way—if you have to remove a uterus, generally that uterus is diseased. If the body of the uterus is diseased, that cervix is kind in not also becoming diseased. Ninety-five per cent of mine are total because I feel that you may have an apparently non-diseased cervix but if you do a subtotal you can not tell how much trouble is in the cervical glands. Sometimes these patients will have continuous discharge and for that reason a few years ago conization was brought out to prevent that because that was a disturbing factor after hysterectomy. I will admit it is a little harder to do a total, especially in the beginning of a doctor's gynecologic career, than to do a subtotal; however, after doing a few totals I am sure he will find that the bleeding is not any greater and the operation is not much harder and that he has the assurance that he will have no after malignancy in the cervix.

Dr. John F. Dicks (New Orleans): I have enjoyed Dr. Counseller's paper very much and think his moving pictures are splendid. One criticism that I might make of his picture of complete hysterectomy is that he has made the operation look very simple. I would like to add a word of caution to those who have not had much experience that the procedure of complete hysterectomy is far from easy and carries a higher mortality and morbidity than supravaginal amputation. In well trained hands, however, it should be done more often. The general trend is towards complete hysterectomy as Dr. Counseller has so beautifully brought out in his paper.

Dr. Virgil S. Counseller (In closing): In answering Dr. Carter's question regarding whether or not the uterine artery is ligated en masse with the cardinal ligament, I should like to say that in almost all instances only one tie is placed on the cardinal ligament, including the uterine artery. Occasionally, if this mass of tissue is large a second tie will be placed on it. As a rule, when this ligament is exposed, the uterus is kept under tension. The uterine artery is situated on top of the ligament, so that in this position it is more effectively ligated than would be possible if the artery came through the mass itself.

The question of bleeding from the divided uterosacral ligament is important, in view of the fact that the motion picture did not show a clamp on this ligament. Bleeding usually is controlled by maintaining the uterus under tension, and when the uterus has been completely removed from the vaginal wall, four clamps are placed on the vaginal mucosa: one on each lateral angle, one anteriorly and one posteriorly. Traction is maintained on these ligaments, and this usually effectually controls bleeding from the uterosacral ligament. If the cut edge of the vaginal wall is inverted, bleeding from the ligament is controlled by the suture.

In conclusion, I feel that, as has been brought out in the discussion, it is important that surgeons who are just starting their surgical careers be thoroughly advised concerning all types of pelvic surgical procedures, particularly in regard to total hysterectomy. It should not be inferred that total hysterectomy is a procedure easy to perform, since many difficulties might accrue to the inexperienced surgeon who attempts the operation incautiously. However, once the technic has been developed, it is as easy to do total hysterectomy, when the operation is definitely indicated, as it is to perform subtotal hysterectomy.

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ACUTE SUPPURATIONS OF THE MOUTH, PHARYNX AND NECK*

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There are perhaps three so-called essential suppurative processes occurring in the mouth and pharynx. Each is a clinical entity arising as the result of infection, plus certain anatomic configurations which favor the collection and localization of an acute purulent process.

The first is the peritonsillar abscess or common quinsy. It usually follows an acute follicular tonsillitis, of which condition it is a frequent complication and is derived from an infection which migrates to the bottom of a tonsillar crypt, penetrates the capsule and comes to lie in the potential space between the tonsil and the aponeurosis of the superior constrictor muscle of the pharynx. The infection most frequently becomes active back of the middle third of the tonsil and for anatomic reasons already described, ascends along the line of least resistance into the areolar tissue of the soft palate.

Occasionally a peritonsillar abscess will rupture through the substance of the tonsil but rarely will it extend downward in the direction of the tonsillar base because of the

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firm attachment of the pharyngeal aponeurosis to this portion of the tonsillar capsule. The first sign of quinsy is a swelling and dusky congestion of the anterior pillar. In a day or two the uvula is deviated towards the healthy side and when the process has reached its mature stage (about five days following onset and longer perhaps in old cases where dense fibrous connective tissue adhesions are present), the purulent collection is found above the upper pole of the tonsil among the glandular elements and areolar itssues of the soft palate.

In a very few instances we have watched a quinsy run its entire course while occupying a retrotonsillar position; that is, a localized collection of pus back of the tonsil which showed no tendency to migrate upward to the supratonsillar fossa. Such a condition often offers a perplexing problem for diagnosis and resists most skillful attempts at surgical drainage. One must not fail to search the retrotonsillar tissues diligently by blunt dissection when dealing with a suspected lesion of this character.

RETROPHARYNGEAL ABSCESS

The second essential suppurative process occurring in the throat is the retropharyngeal abscess. It represents the end stage of a glandular suppuration and is found in a pocket of areolar tissue back of the superior constrictor muscle of the pharynx. Within this region, the so-called post-pharyngeal space, there are four chains of glands, two on either side in front of the bodies of the second and third cervical vertebrae, the largest chain being situated directly back of the posterior pillar of the fauces. A careful dissection of this region in infancy and early childhood will reveal ten to twelve lymphatic glands in this space. Therefore when atrophy of these glands has taken place, there is little likelihood of the development of a retropharyngeal abscess. It is a disease of childhood, most cases appearing before the age of six and rarely seen in adult life.

The symptoms depend upon the location of the abscess. It is to be remembered that the glands are found to one side of the median line of the pharynx; consequently the pocket of pus will be located in corresponding positions. If the abscess develops superiorly in the posterior pharyngeal wall partly back of the soft palate the patient will present difficulty in swallowing and give a nasal intonation to the voice. If the abscess occupies a lower position there will be evidence of dysphagia and some degree of respiratory embarrassment. It must be remembered that the larynx of the child is situated about one vertebrae higher than that of the adult so that masses and swellings in the pharynx of children tend early to encroach upon the lumen of the larynx and produce the signs of respiratory obstruction.

The posture of the child is occasionally pathognomonic of retropharyngeal abscess. There is a tendency for the patient to tilt the head towards the healthy side and hold it in that position with some degree of rigidity. Many times the diagnosis is made by the characteristic posture of the head when the patient enters the doctor's office.

The diagnosis of post-pharyngeal abscess frequently offers some difficulties for the general practitioner. The true identity of the disease is not revealed until the process in the throat has become large enough to cause respiratory obstruction. The child refuses food, violent general reactive symptoms are in evidence and occasionally one hears an irritative cough not unlike that of croup.

We cannot pass by without simple mention of the value of radiographic examinations of the neck in patients suspected of harboring a retropharyngeal abscess. A soft tissue detail of the cervical region will clearly define many constant landmarks and likewise demonstrate a widening of the shadow in front of the bodies of the spine if a purulent collection is present in this region. Much information of great value can be obtained from lateral radiographs of the cervical region and particularly is this true when we are dealing with a process of the proportions of an abscess in the space between the air and food passages and the bodies of the cervical spine.

LUDWIG'S ANGINA

The third essential suppurative process is one which, although rarely seen, carries a high mortality and represents an infection capable of producing grave complications. It is Ludwig's angina, a phlegmonous process, occurring in a definite anatomic space in the sublingual region either above or below the geniohyoid muscle. This space, into which lymphatics from the floor of the mouth drain, is bounded laterally by the mandibles, above by the muscles of the tongue and the mucous membrane of the mouth and below by the mylohyoid muscle. Because the infection of Ludwig's angina is confined within these boundaries it frequently sets up alarming symptoms and eventuates in complications of a grave nature. Some writers on the subject state that the mortality is about fifty per cent.

In studying a frontal section of the head cut through the sublingual region one will observe clearly that the abscess may occupy one of four possible positions. It may be found in the potential space between the muscles of the base of the tongue and the geniohyoid muscle, it may be observed to lie at a lower level between the geniohyoid and mylohyoid muscles or it may occupy corresponding positions on the opposite side of the median line. It is exceedingly important to bear these facts in mind when instituting drainage of a Ludwig's abscess. It is doubted that the disease is, as often designated, a phlegmonous process without the formation of pus. A purulent collection is probably present in every instance and failure to find it at the time of drainage is due to the surgeon's unfamiliarity with the four possible positions above described and his neglect to search these regions on both sides of the midline.

The signs and symptoms are well known to all of us. The tongue is broad, red and swollen; it is relatively immobile and elevated against the hard palate. There are congestion and edema of the mucous membrane covering the floor of the mouth and one may find the imprints of the lower incisor teeth in the edematous tissues adjacent to them. Externally there is more or less inflammatory swelling below the symphysis of the jaw although fluctuation on palpation is seldom noted. The external mass may be excruciatingly tender on pressure and display the classical signs of inflammation, although one rarely gets the feel of pus in this region. The speech is gutteral, saliva drools from the mouth, swallowing becomes difficult and later encroachment of the disease upon the tissues at the base of the tongue gives rise to respiratory embarrassment.

When the infection has broken down its barriers and migrated to the soft tissues of the neck, an extensive phlegmon may circumscribe the entire cervical region. Hippocrates described such a condition under the term cynanche which literally signifies "dog choking." His was an advanced case in which a diffuse suppurative process enveloped the neck in a dog-collar fashion.

Associated with the above signs and symptoms are fever, chills and general indications of profound sepsis. In its aggravated form and when a septicemia supervenes the symptoms of Ludwig's angina are those produced by its complications.

The treatment is surgical and drainage may be accomplished in two ways. If the abscess is situated beneath the geniohyoid muscle as expressed by a large external swelling under the chin with only minor changes in the mouth and tongue, it may be drained by an external incision and blunt probing for the purulent collection. When found, a drainage tube is introduced into the cavity and the latter irrigated with Dakin's solution. If, however, the inflammatory reaction in the mouth and tongue preponderate, the abscess may be adequately drained by an incision under the tongue through the floor of the mouth to one side or the other of the median line. Again we emphasize the great importance of early diagnosis, early drainage and unfailing recognition of the four possible locations of pus in the anatomic spaces beneath the tongue.

SUPPURATIVE DISEASE OF PAROTID GLAND

When these essential suppurative processes break down their barriers and mi-

grate to other parts of the cervical region what course do they usually pursue? Where do these infections go when they leave their original pocket and invade the tissues of the neck? In nearly every instance they extend into the lateral pharyngeal or pharyngo-maxillary fossa, a space which is limited above by the base of the skull, continues down the neck as the carotid sheath and opens below into the posterior mediastinum. When studied in cross section at the level of the angle of the jaw where it is most clearly identified, this fossa is bounded anteriorly by the superior constrictor muscle of the pharynx, laterally by the ramus of the jaw covered by the internal pterygoid muscle, and the inner prolongation of the parotid gland and posteriorly by the muscles which cover the bodies of the cervical spine.

The lateral pharyngeal fossa contains areolar tissue, a dense plexus of lymphatics and the contents of the carotid sheath. It is exposed to infection on all sides; from the pharynx in peritonsillar and retropharyngeal abscess formation; from the bodies of the vertebrae in tuberculous or non-specific infections of these structures and from the parotid gland whose inner prolongation dips mesially under the angle of the jaw and becomes closely associated with the pharyngo-maxillary space. Because of this anatomic relationship we frequently follow the course of a primary suppurative process in the throat through the lateral pharyngeal fossa and thence into the parotid gland. By the same token the abscess may extend in the opposite direction from its original focus in the parotid gland to some point within the region of the pharynx. Such a sequence occurs frequently enough to be regarded a clinical entity.

The treatment of suppurative disease of the parotid calls for massive drainage of the gland. This is best obtained through an incision which starts above near the zygoma immediately in front of the ear and extends downward parallel with the ramus of the jaw to a point beneath and well in front of the angle of the jaw. The skin and subcutaneous tissue are then reflected forward, permitting a wide exposure of the entire gland. It will be noted that the parotid gland lies immediately beneath the skin and subcutaneous tissue and that the fibers of the facial nerve pass through its structure at a rather deep level. Incisions may be made to a considerable depth within the substance of the gland without danger of doing injury to the seventh cranial nerve. It is to be remembered that the parotid gland is composed of compartments or acini and that a stab incision into one of these structures does not constitute adequate drainage of a suppurative gland. When such a technic is employed it may be necessary to make many stab wounds on successive hours or days before signs of resolution become apparent. Much time is saved and pain avoided by the establishment of massive drainage through an incision, which exposes the entire gland in the manner above described.

SUPPURATIVE PROCESSES IN THE CERVICAL REGION

Deep suppurative processes in the neck may attack and do great injury to the contents of the carotid sheath. Particularly is this true of the internal jugular vein which may become the seat of a phlebitis or a thrombophlebitis. If, during the course of a deep seated inflammatory process in the neck beneath the steroncleidomastoid muscle, the patient exhibits chills and fever and demonstrates signs of sepsis, the presence of a phlebitis or thrombophlebitis should be suspected and the vein exposed, ligated and resected. Blood cultures will be positive in the majority of such cases, although the operation should not be delayed until positive cultures are obtained. Immediate surgical interference of the character described offers a life saving measure to those in whom a cervical phlegmon has invaded the internal jugular vein.

It must be remembered too that the large vessels of the neck may be eroded by a suppurative disease and give rise to fatal hemorrhage. Interesting enough, such a grave accident is usually preceded by the show of small quanties of blood before the lethal gush occurs. The child with a peritonsillar

or retropharyngeal abscess experiences some bleeding of minor significance from the throat; several hours later another hemorrhage of larger proportions occurs; the next day, perhaps, further bleeding of an alarming nature and finally a terrific flow of blood from the pharynx which brings the patient's life to an end. Thus is observed the usual course of an infective process which erodes a large vessel in the neck. Several hemorrhages of increasing proportions presage the fatal loss of blood and the recognition of this entity warns the surgeon of impending danger and emphasizes the need of immediate surgical interference. Here again the anticipation of such an accident calls for another life saving measure, namely the ligation of the common carotid artery.

The course of an acute suppurative process in the cervical region may cover a wide range of clinical manifestations and give rise to pathologic changes of a bizarre character. The capricious behavior and often bewildering influences of inflammatory disease in this part of the body have given rise to diligent research and clinical experimentation in this field. In this particular study laryngologists have advanced with striking rapidity. The great importance of early recognition of the many morbid changes produced by inflammations in the neck, and the value of well directed surgical efforts in reducing the mortality to something less than an inevitable slow and painful death, has been learned. To the sum and total of this knowledge, has been added a clearer understanding of the mode of spread of infections to the mediastinum and rational methods for the treatment of an acute suppurative process within this part of the thoracic cage.

ACUTE MEDIASTINAL INFECTIONS

In this connection, reference is made to acute mediastinal infections arising from an inflammatory process within the tissues of the mouth, pharynx and cervical region. For an understanding of the etiologic factors which favor the development of such a process, a study of the pathways along which infection may travel through the deep cervical tissues is imperative. To this end an attempt has been made to observe the complex arrangement of the cervical fascia in a study of serial sagittal transverse sections of the neck and thorax, to which embryologic observations have been added in support of some of the opinions herein expressed. In order to gain a better perspective of these anatomic relations, gross dissections of the cervical region and thorax were made. These comprised a careful reflection of the planes of the body, commencing with skin and subcutaneous tissue, and following in orderly sequence from without inward, layer by layer, until the dorsal and cervical vertebrae were exposed.

Thus, as one would read and turn the leaves of a book, from the first to the last page, the true story of an anatomic dissection is revealed and the relative importance of its component parts determined through a careful and orderly study of the adjacent structure of the body. In this, one may obtain, as by no other means, an explanation for the clinical behavior of many of the deep seated suppurations of the neck and mediastinum.

DESCRIPTION OF FASCIAE

In a general way the cervical fascia may be classified into two main groups of layers, each of which gives off innumerable connective tissue processes which unite to form a structural support for the tissues within the neck. The first of these groups is a system of fascial planes which, starting above at the summit of the neck, descends with the cervical muscles to become attached to the upper edge of the thoracic cage. This group embraces the fascia of muscle, and from without inward includes the superficial layer of deep cervical fascia, the fascia enveloping the omohyoid and sternohyoid muscles, and at a deeper level the fascia which follows the plane of the sternothyroid and thyrohyoid muscles.

This system of fascial layers forms spaces within the neck variously described as the anterior or previsceral compartments. They do not communicate directly with any part of the mediastinum. Although they may appear to lie in relation to the

retrosternal space, the attachment of their fascial walls to the upper margins of the thoracic cage forms their inferior limit and clearly separates them from any part of the thoracic cavity. The study of sagittal sections of a three-month human embryo is convincing proof of this fact. Here one observes that the innermost muscle layer of the neck is attached to the posterior surface of the sternum, forming the inferior boundary of the previsceral spaces within the muscles of the cervical region. It may be further demonstrated that iodized poppy seed oil, 40 per cent, injected into this region, fills the various spaces but finds a definite barrier below to its escape into the mediastinal cavity.

It would seem, then, that retrosternal infections are not to be considered in suppurative processes of the neck. This region, commonly referred to as the anterior mediastinum, is a small space which is separated from the cervical tissues by the thymic capsule. It is rarely affected by inflammatory processes, except those which extend from an osteomyelitis of the sternum or occur as the result of penetrating wounds of the anterior wall of the chest. This fact is perhaps worthy of note when drainage of the mediastinum is to be considered.

The second group of cervical fasciae is of greater interest in this study, because it forms definite pathways along which infections may travel from the neck to the mediastinum. For practical purposes, we may divide this group into two main systems, each contributing to the formation of clearly defined fascial planes along which infection is prone to spread.

The vasculovisceral system of fascia, as the name implies, envelops the viscera of the neck and mediastinum, and likewise surrounds the carotid sheath, the aorta (its arch and descending portion) and its many branches. It forms a cylindric covering of the pharynx, larynx, trachea, thyroid gland, aorta and its branches which ascend into the neck. Within the thoracic cavity this fascial coat blends anteriorly with the pericardial sac, and behind surrounds the aorta and extends laterally with the intercostal arteries, to become thin where it merges with the parietal pleura. At the level of the dome of the pleura this fascial layer is greatly strengthened to enclose the subclavian artery and form the main suspensory ligament of the pleural dome.

For a clearer understanding of this fascial system, let us trace its component parts from without inward in a sagittal section of a fresh subject. Beginning at the lower border of the thyroid gland, one observes a distinct layer of fascia descending in the neck to become attached to the posterior surface of the sternum. It may be traced laterally as far as the external surface of the parietal pleura, where it forms the sheath of the internal mammary artery. Immediately beneath this fascial plane are uncovered the lymphatic drainage of the thyroid gland, the remains of the thymus and the inferior thyroid vein. Posterior to the thymus is observed another layer of fascia which encloses the innominate veins and the superior vena cava, and extends from the pretracheal fascia above to the mediastinal pleura below. Between this fascia of the superior vena cava system and the layer previously described, which extends from the lower edge of the thyroid gland downward and forward to the posterior surface of the manubrium, lies the thymic capsule or thymic space containing the inferior thyroid veins and the lymphatics of the thyroid gland.

As the dissection is carried deeper in the neck, the pretracheal fascia is next in order. Enclosing the larynx, trachea and thyroid gland, it descends into the mediastinum, surrounding the tracheobronchial lymphatic system, the arch of the aorta and the right branch of the pulmonary artery, to blend finally with the pericardial sac at the angle of reflexion of the parietal and visceral pericardium. Laterally in the neck the pretracheal fascia merges with the sheath of the common carotid artery. It continues posteriorly to form the retropharyngeal or bucopharyngeal fascia of the pharynx and the retro-esophageal fascia of the esophagus, and where the left side of the trachea is crossed by the arch of the aorta, it con-

tinues downward to enclose the descending aorta. Thus, there is formed within this fascial investiture the middle or visceral compartment of the neck. There is a wealth of experimental evidence to prove that this space communicates directly with that part of the mediastinum which lies between the arch of the aorta in front of the trachea, posteriorly. This region has been termed the anterior mediastinum, because it is the extreme anterior space which lies in direct communication with the fascial planes of the neck. The potential space immediately beneath the sternum, and in front of the pericardium, usually referred to in anatomic texts as the anterior mediastinum, is, in my opinion, more correctly termed the retrosternal space. As previously demonstrated, this space does not communicate with the soft tissues of the neck and plays no part in the descent of suppurative processes below the lower boundaries of the cervical region.

The second division of the vasculovisceral fascia, the prevertebral system, lies in front of the bodies of the cervical and dorsal vertebrae from the basilar process of the occipital bone down to the lumbar region, where it blends with the external perimysium of the psoas muscle and the crura of the diaphragm. In the cervical region this fascia encloses the prevertebral muscles, and on each side of the median line it is reinforced by the perimysium of these muscles. In the region of the posterior mediastinum, below the level of the third or fourth dorsal vertebrae, the prevertebral fascia loses this reinforcement and becomes exceedingly thin.

The prevertebral fascia forms the posterior wall of the retrovisceral space, or posterior compartment of the neck. This space, which is perhaps the most important pathway between the upper cervical region and the mediastinum, is limited in front by the buccopharyngeal fascia, which is continued downward as the retro-esophageal fascia, and deep in the chest forms the interpleural ligament and the sheath of the descending aorta. By the injection of iodized oil the retrovisceral compartment can be visualized from the retropharyngeal region above to the posterior mediastinum below. Moreover, it can be demonstrated that the iodized oil does not spread to adjacent parts of the neck, but remains strictly confined to the boundaries of the retrovisceral space throughout its entire descent to the thoracic cavity.

The clinical significance of this pathway is obvious. Its intimate relation to the vertebrae, esophagus and lymph nodes within its upper extremity exposes it to infections from all sides. The occurrence of mediastinal suppuration, secondary to retropharyngeal abscess, has been common enough to command respect for the practical anatomic considerations of this important communication between the tissues of the cervical region and the posterior mediastinal space.

SURGICAL TREATMENT OF SUPPURATION OF MEDIASTINUM

In a previous publication I have discussed more precisely the surgical treatment of acute suppurations of the mediastinum. Some of the phases of this study are now reiterated in order that a few links may properly be added to the chain of events which have transpired since the time of the first surgical efforts in this field.

Thoracic surgeons are more or less unanimous in the opinion that suppurations below the fourth dorsal vertebrae call for posterior drainage. Such processes, which are found low in the mediastinum, may arise from disease of the esophagus, caries of the thoracic vertebrae or extension from the abdominal cavity. Preferably these may be approached and adequately drained by dorsal mediastinotomy, in which the thoracic cavity is opened posteriorly by a resection of ribs or by the removal of one or more transverse processes with a portion of the attached rib.

Cervical mediastinotomy is a far more conservative measure, and one which often serves admirably to drain infections in the upper portion of the mediastinum. When pus enters the mediastinum from the neck, this procedure would seem the one of choice. To drain an abscess through the tis-

sues which it has invaded is, we believe, a surgical axiom which in no other region of the body can be more advantageously applied.

Cervical mediastinotomy, moreover, has been successfully employed in traumatic perforations of the upper part of the esophagus. Through this technic, foreign bodies which have perforated the walls of the esophagus have been recovered. Esophageal perforations are sealed with packing to avoid a fatal mediastinal emphysema, and drainage of subsequent mediastinal infection is adequately established. This is a heroic measure, to be sure, but one which definitely possesses life saving possibilities for the unfortunate victims of this grave accident.

TECHNIC OF CERVICAL MEDIASTINOTOMY

The technic of cervical mediastinotomy is simple enough. One point of interest, however, is the selection of a site for the primary incision. This may be of little importance, although it occurs to me that the right side of the mediastinum is, for anatomic reasons, the logical approach. The three large vessels—innominate, left common carotid and left subclavian arteries—esophagus, trachea and descending aorta divide the posterior mediastinum into a right and left compartment. The right compartment is the larger; it contains many more lymphatic glands and is therefore the site of predilection for inflammatory processes in this region. A right-sided exposure of the posterior mediastinum is obviously the procedure of choice when there is reason to believe that infection has extended through the neck by the lymphatic route. Of considerable importance, also, is the fact that the esophagus on the left lies in close relation to the pleura as it enters the thoracic cavity, while on the right the pleura and esophagus come in contact at a lower level behind the pericardium. Thus, in approaching the mediastinum on the right, there is less risk of injury to the pleura.

Under local anesthesia, an incision from 5 to 6 cm. long is made over the anterior margin of the sternocleidomastoid muscle down to the suprasternal notch. When the sternocleidomastoid, sternohyoid and sternothyroid muscles have been exposed, these structures, together with the contents of the carotid sheath, are retracted laterally, exposing the trachea and, at a deeper level, the right side of the esophagus. It may be necessary to elevate the right lobe of the thyroid, in which event care must be taken not to injure the inferior thyroid artery which enters the gland on its posterior surface close to its inferior pole. At this point one must choose to enter by blunt dissection either the anterior mediastinum, which lies between the trachea behind and the arch of the aorta in front, or the posterior mediastinum along the lateral wall of the esophagus. A guide to the procedure of choice might be found in a study of the etiologic factors producing the abscess. If suppuration has descended into the visceral space, it is presumptive evidence that the inflammatory process within the mediastinum will be found in its anterior part; if, on the other hand, the course of invasion is along the retrovisceral space, the posterior mediastinum becomes the logical site of predilection. A drainage tube in introduced and suction applied at frequent intervals. Some advantage may also be derived from postural drainage by placing the patient in the Trendelenburg position.

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SYMPOSIUM ON VASCULAR THROMBOSIS*
OBSERVATION ON THE USE OF HEPARIN

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Heparin is a complex organic anticoagulant derived from tissues. Its exact composition and mode of action are unknown.[1] Charles and Scott,[3] and others have prepared pure stable solutions of heparin for experimental or clinical use. A highly purified heparin, known as liquaemin, is being distributed in the United

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States.* Liquaemin is standardized in anti-coagulant units. One unit equals the quantity of liquaemin required to keep one cubic centimeter of recalcified citrated beef plasma liquid for four hours at 37° C. Each cubic centimeter of liquaemin contains 2000 ACU's. Administration is intravenous. Six 5 c.c. vials of liquaemin, containing 60,000 anti-coagulant units are used per liter of normal saline or glucose solution. Two thousand centimeters of this mixture are administered every twenty-four hours. The rate of infusion is adjusted so that a clotting time (by the multiple tube technic of Lee and White) of fifteen minutes plus is maintained. Heparinization may be continued from five days to three weeks depending on the response and indications. Protamine[1-8] may be used to terminate the heparinized state, but cessation of the infusion usually results in a normal clotting time within thirty to sixty minutes.

Heparin in pure form is not toxic. No undesirable effects have been reported and confirmed except those which might be expected as a result of the prolonged coagulation time. Heparin has been injected into the donor in order that blood may be collected for transfusion, without coagulation.[5] It has been shown that heparin will prevent thrombosis due to chemical or mechanical trauma to blood vessels and that healing occurs in these vessels without thrombus formation.[4] Heparin has been used to prevent postoperative thrombosis in general.[12, 13] It has been used in the treatment of retinal vein thrombosis.[6] It will prevent the development of cardiac mural thrombi[9] in experimental myocardial infarction and is used as an adjunct to the treatment of bacterial endocarditis with sulfapyridine.[10, 11] Its use in subacute bacterial endocarditis is based on the theory that "the prevention of new fibrin and platelet formation might allow the valvular process of repair and sterilization to gain ascendency and thus terminate the infection." Four different preparations of heparin have been used in the various experimental and clinical studies in the literature. The dose used is one which will prolong the coagulation time to the limit desired and this varies with the preparation and the patient.

*Roche-Organon, Incorporated.

CASE REPORT

I shall illustrate the clinical use of heparin by describing the case of Mrs. F. T., who was admitted to the hospital on September 19, 1940. Approximately eleven months ago the patient developed an attack of paroxysmal auricular flutter. She had rheumatic heart disease of an unknown duration. The patient was given digitalis and quinidine and she recovered from the tachycardia and accompanying heart failure after bed rest, lasting approximately one and one-half months. The diagnosis on discharge was rheumatic heart disease; mitral stenosis; auricular fibrillation; chronic myocarditis; cardiac enlargement; congestive failure, class 2-B. During this illness the patient developed a morning diarrhea producing four or five stools. Giardia lamblia were found and occasional doses of sodium sulphate prevented a recurrence of the symptoms.

Present illness: On September 14, 1940, while out of the city, the patient developed a cramping abdominal pain and passed three semi-liquid stools. Tenderness was noticed in the right lower abdominal quadrant. Although the patient had no fever at this time, she was returned to New Orleans for observation. A stool examination on September 16 revealed *Entameba histolytica*. Anayodin was prescribed and the next day the patient took three pills; during the night she passed ten liquid stools with tenesmus. The following morning after a breakfast of cream cheese, she developed severe cramping pain over the entire abdomen and the temperature went up to 99.6. The pain continued intermittently and on September 18, the blood count revealed 13,500 white blood cells per cu. mm. with 93 per cent neutrophils. The urine showed a trace of albumin, a 2 plus acetone and many white blood cells. Food caused nausea and vomiting.

On the morning of September 19, the patient's abdomen was slightly rigid and pain had shifted to the left costovertebral angle. The patient was brought to the hospital in spite of vigorous protest. A consultant was called. The temperature was 101° F. A. blood count revealed 4,170,000 red blood cells per cu. mm., 89 per cent hemoglobin, 26,200 white blood cells per cu. mm. and 97 per cent neutrophils and 3 per cent small mononuclears. The patient complained of pain in the sixth segment of the left side of the chest anteriorly which was exaggerated by respiration. Physical examination of the lungs was negative. A negative urinary sediment on this date, plus the findings of pus and albumin on the preceding day, plus the pain in the left costovertebral angle,

suggested a blocked kidney. A urologist was called and the patient was cystoscoped with entirely negative findings. An EPA of the chest showed an enlarged heart with very large auricles and an area of increased density in the lower left lobe of the lung towards the pulmonary sulcus in the axillary region. In the afternoon the patient developed a dry cough. Since no sputum could be obtained, sulfathiazole 1 gram every four hours was tried for three days without effect on the temperature or pulmonary findings. Emetine-hydrochloride and diodoquin tablets were prescribed.

By September 23, the red cell count dropped to 3,430,000, hemoglobin to 65 per cent. The white cell count was 19,200 white blood cells per cu. mm., 93 per cent being neutrophils. Iron therapy was begun. Sulfathiazole was discontinued and neoprontosil, grs. 10, every four hours, was substituted. The dose of diodoquin was increased to 6.4 grams daily. Two thousand centimeters of 5 per cent glucose and normal saline were given by infusion for dehydration and nausea. On September 24, the patient's bowels were moving normally and the abdominal symptoms were much improved. The temperature continued to be septic, varying between normal and 101° F. A blood culture was made. On September 27, the blood count was 15,860 white blood cells per cu. mm., with 73 per cent neutrophils. On the evening of September 28, the patient complained of numbness in the right hand and emetine-hydrochloride was stopped because of possible peripheral neuritis.

On September 29 the patient had chilly sensations through the night with mild rigors. At about four a. m. she noticed that she could not move the left leg. A few moments later the leg began to pain severely. Upon examination at 6 a. m. the leg was found to be bluish and mottled to a point eight inches above the knee. The entire extremity was cold and dry with all the small varicosities distended with blackish blood. Blanching could be produced by pressure, color returning slowly within thirty-five seconds. A diagnosis of embolism of the left femoral artery was made and in retrospect the abdominal symptoms and pulmonary infiltration were thought due to infarcts resulting from small emboli. A heat tent was placed over the extremity and one and a half hours later the extremity was warm and pink, the venous engorgement having disappeared. An hour later the leg became blanched and pale from the middle of the thigh downward. The heat tent was removed for ten minutes and the leg found cold and pale in comparison to the opposite extremity. In view of the patient's general condition, conservative therapy was the concensus from the beginning in spite of the 40-67 per cent chance of gangrene of the left leg. A surgeon was consulted and a para-vertebral sympathetic block was done at approximately noon, eight hours after the clinical onset of embolism. The sympathetic block relieved the pain but the temperature of the extremity was unchanged. The sympathetic block was repeated nine hours later, at 9:30 the night of September 29, to relieve a recurrence of severe pain in the left leg. No blood pressure change resulted from this procedure. The blood count showed 3,730,000 red blood cells, 89 per cent hemoglobin, 23,500 white blood cells, 92 per cent neutrophils. On the second day of the embolism the patient was given a transfusion of 500 c. c. of citrated blood and oxygen was begun, using the Boothby-Lovelace mask, in an effort to increase the oxygen carrying power of the blood to the involved extremity. At noon the nurse noticed that the pulse could not be felt in the right arm. The blood pressure in the left arm, at that time, was 120/80 approximately, and in the right a few sounds could be heard between 80 and 74 mm. of mercury. Possible embolism or thrombosis of the right brachial artery or minor embolisms of its branches with arterial spasm, was suspected. Heparinization was suggested. One of us thought this might cause loosening of the auricular thrombi and further embolism. After discussion it was agreed that death would result if gangrene developed. Therefore on the third day of the embolism, liquaemin was obtained and a continuous infusion containing 60,000 anti-coagulant units per 1000 c. c. of 5 per cent glucose was begun. The coagulation time by the capillary tube method rose from 4 minutes to 5 minutes 40 seconds. The patient complained of numbness in the right leg in the afternoon. The blood count was essentially unchanged. The NPN was 54 mg. per cent, urea nitrogen 27 mg., uric acid 3.4 mg. per cent, creatinine 2.3 mg. per cent and dextrose 84 mg. per cent. On the fourth day, the clotting time (by Lee and White method) increased to fifteen minutes. On the fifth day the needle came out of the patient's vein while the coagulation time was ten minutes. Within thirty minutes after this accident the coagulation time had decreased to within one-half to one minute. The needle was reinserted into the left anti-brachial vein and within three hours the coagulation time was 7 minutes. On October 3, three days after the initiation of heparin therapy, pulsation returned in the right arm and the blood pressure once more reached the level found in the left, that is, approximately 128/80.

Between the sixth and eighth day following embolism, that is, the fourth through the sixth day of heparinization, the patient showed a gradual accumulation of fluid in the tissues. The edema affected the entire body and was particularly visible in the deep structures of her neck. The amount of fluid per unit of liquaemin was cut in half in an effort to minimize this accumulation.

No improvement was noted in the circulation through the left leg until the sixth day of heparinization. At this time blanching produced by pressure would disappear rapidly in every part of the

leg except that from a point two inches above the ankle downward. On this day the blood chemistry returned to normal levels. The serum proteins were normal. Cardiac failure and possibly increased capillary permeability were the only factors found to explain the edema. In spite of favorable progress of the embolic process, mental apathy, delirium, period of irrational behavior and muscle twitching occurred and apparently paralleled the degree of edematous swelling. These symptoms remained unchanged between the eighth and tenth post-embolic days. The coagulation time was maintained between 12 and 23 minutes. On the eighth day of heparinization, the serum protein, blood chloride and NPN phosphorous, calcium and carbon dioxide combining power were within normal limits. The red cell count was 3,850,000, 76 per cent hemoglobin, 15,900 white cells per cu. mm., 80 per cent neutrophils, mean corpuscular volume 40 cubic microns. Therefore, no satisfactory explanation could be found for the mental symptoms, plus fibrillary muscle twitchings, except toxic encephalitis or cerebral edema. The temperature returned to normal for the first continuous twelve hour period. On this date the patient developed a Cheyne-Stokes type of periodic breathing which was exaggerated by the sedatives used and partly relieved by coramine.

The coagulation time was maintained between 20 and 30 minutes until October 12, the fifteenth day after the occurrence of the embolism. On this same day the edema and the periods of irrational behavior began to disappear and the circulation in the leg to improve. The patient was able to dispense with oxygen therapy for short periods. On the following day oxygen therapy was discontinued and the liquaemin gradually decreased during the next four days. The edema gradually disappeared and could not be demonstrated on October 16, the eighteenth post-embolic day, with the exception of some slight swelling which persisted in the left leg. On this date the liquaemin was discontinued. Two days later the coagulation time returned to normal.

On the twenty-sixth post-embolic day the blood count was 4,210,000 red blood cells, 80 per cent hemoglobin, 11,200 white blood cells per cu. mm., 73 per cent neutrophils, 27 per cent small mononuclears. The left lower extremity was slightly paler than the right and all sensation below the knee was interpreted as burning. On the twenty-ninth post-embolic day the heat tent was discontinued and the foot wrapped in cotton batting, retained heat being sufficient to keep the foot warm. On the thirtieth post-embolic day, elevation of the foot resulted in blanching and burning pain from two inches above the ankle downward into the left foot. Lowering the foot below the body level caused it to assume a bluish color, but did not seem to increase its warmth. Careful examination at this time revealed marked atrophy of the muscles with some contraction of the gastrocnemius tendon, placing the foot in the equinus position. Some slight movement of all muscle groups was possible. Deep sensation was destroyed below the middle of the leg. A Sanders vasoscillator was secured to increase circulation in the extremities. One half hour after the oscillation started the patient became "sea-sick." Sea-sickness was avoided in the future by permitting the bed to be stationary for one hour after meals. On the thirty-fourth post-embolic day the white blood count was 13,100 per cu. mm., with 78 per cent neutrophils. Thiaminhydrochloride 20 mg. intra-gluteally, three times daily, was given for the ischemic neuritis. The stool was examined for ameba and none were found, therefore, the diodoquin was discontinued. On the thirty-sixth postembolic day, the patient's temperature, pulse and respiration were within normal limits. Simple exercises were suggested for the left foot and two days later the patient was able to stand without assistance but with considerable pain due to stretching of the gastrocnemius group of muscles.

Improvement has continued uneventfully up to the present. Two months after the embolism the patient was permitted to walk about her room using soft slippers; however, she was required to continue to lie upon the vasoscillator for a minimum of one hour, three times daily. At present the patient walks without visible impairment of function of the left lower extremity and carries on modified household duties. The left leg is much warmer than the right and behaves as does the completely sympathectomized extremity. Slight residual atrophy of the muscles of the left leg may be seen. Hyperesthesia is present below the ankle.

SUMMARY

This case history illustrates many of the problems met in the clinical use of heparin. The preservation of life and limb was apparently made possible by its use.

Heparin should be used in medical disorders as a method of minimizing infarction due to proved thrombosis or embolism. If reasonable doubt exists that sudden vascular occlusion is due to thrombosis or embolism, or if bleeding due to the prolonged coagulation time cannot be controlled by other measures, it should not be used.

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RATIONAL THERAPY OF THROMBOPHLEBITIS

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Although the immediate consequences of thrombo-embolic phenomena are generally realized, its subsequent morbidity is insufficiently appreciated. The patient, apparently recovering from an operation and preparing to leave the hospital, who suddenly dies from a massive pulmonary embolism forms a picture of a tragic catastrophe. Although not as tragic in its immediate consequences, the patient who recovers from a postoperative or post-puerperal thrombophlebitis frequently develops persistent thrombophlebitic sequelae, such as postphlebitic edema, varicosities, and ulcerations, resulting in an extremity which is a handicap the rest of his life. For these reasons, the immediate as well as the subsequent consequences of thrombo-embolic phenomena are of concern to the physician. Moreover, this complication is not of infrequent occurrence. Of even greater importance is the fact that there is apparently an increasing incidence in recent years. For example, it was found that during the period 1920-1927 there was a five-fold increase in postoperative thrombo-embolism.[1-3] It is difficult to establish the exact incidence of thrombo-embolic phenomena, but some idea of its relative frequency may be obtained from the following statistics. Several observers[4, 5] have found that pulmonary embolism was considered the cause of death in approximately 8 per cent of all autopsies. At the Wisconsin General Hospital, Burke[6] found that of 2,613 autopsies there were 648 (24 per cent) cases with evidence of thrombosis. Of this number 427 were strictly medical, 195 surgical, and 26 miscellaneous. It may be observed from these statistics that thrombosis follows medical conditions even more frequently than surgical procedures. The occurrence of postoperative thromboses also varies, depending upon the type of operation. In general, the highest incidences are found following abdominal and pelvic procedures. In a collected series[7] of 133,458 operations, postoperative thromboses were found in 0.6 per cent. At the Mayo Clinic, of 172,-888 operations, postoperative venous thrombosis and pulmonary embolism occurred in 1,665, an incidence of 0.963 per cent. From these statistics it becomes obvious that intravascular venous clotting occurs with sufficient frequency to warrant serious consideration.

ETIOLOGY

The etiology of thrombophlebitis has not been established, but a number of factors have been found which play significant roles in its development. No attempt will be made here to discuss these in detail as they have been considered in previous publications.[7,9] Briefly, these factors fall into two general groups; (1) predisposing, and (2) precipitating. Of the former the most important are constitutional diatheses, obesity, debility, systemic infections, pregnancy, trauma, operation, and circulatory disturbances. The precipitating factors consist of vas-

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cular changes, blood changes, infections, and circulatory retardation. It has been observed that a definite familial tendency may exist in some cases and that certain individuals belonging to the asthenic adipose type are more likely to develop the complication. Obesity has been considered as a factor in the production of thrombosis, because the incidence of the complication is higher in these cases and because of the greater likelihood of circulatory retardation and the possible liberation of large quantities of lipoid thromboplastic substances. The frequency of venous thrombosis in carcinoma has recently been emphasized.[10] Systemic or localized infections are also believed to predispose to thrombosis. Of the former, the most important are typhoid fever, influenza, and arthritis. Pregnancy is considered a factor because of the increased intra-abdominal tension and pressure on the pelvic veins resulting in increased venous pressure in the lower extremities. Trauma, either operative or non-operative, may also be an important factor by causing direct injury to the vessels or as a result of injurious substances derived from destroyed tissue.

Certain changes in the vessel wall as well as in the blood may form a precipitating factor in the development of thrombophlebitis. The blood changes consist of those occurring in the plasma as well as in the cellular element. Of the former, the most important are increased viscosity, hyperglobinemia, increased fibrinogen content, increased antitryptic power, peptidase and calcium content, and decreased carbon dioxide combining power. Changes in the cellular element consist principally of increased platelet count and an increased agglutination tendency. The red blood cells show an increased sedimentation rate and the leukocytes show an increased agglutinability. Infection may play an indirect role by producing a decrease in the electric charge of platelets, resulting in their increased agglutinability, or a direct role by causing endothelial destruction, resulting in the liberation of tissue changes and the production of intravascular clotting. Of the precipitating factors, circulatory retardation is probably the most significant. Any condition which will interfere with the normal return circulation and predispose to venous stasis may act as a precipitating factor. Accordingly, posture, immobility, hypopnea, and increased abdominal tension may produce circulatory retardation.

CLINICAL MANIFESTATIONS

The clinical manifestations of thrombophlebitis are usually quite apparent and may be considered under two groups; systemic and local. Of the former, fever and increased pulse rate are the most prominent. Fever is usually of the low-grade character and the temperature curve may be of a characteristic step-ladder type. However, in cases with femoro-iliac thrombophlebitis, particularly if the infection is marked, the temperature may be of a hectic type associated with chills. Pain is quite a prominent manifestation and is usually limited to the involved area, but is aggravated by motion and dependency. An increased pulse rate is a consistent finding and may be of great significance, because it is frequently the first evidence of the development of the condition. Of the local manifestations, swelling of the extremity is probably the most common. This depends, in great measure, upon the type of involvement. It is most marked in femoro-iliac thrombophlebitis and in involvement of the deep veins of the pelvis. It is characteristically aggravated by dependency of the extremity. Tenderness is most marked over the involved area. Color changes as well as temperature changes may be observed in the involved extremity. In cases with superficial vein involvement there is redness as well as increased warmth over the involved area. On the other hand, in deep vein involvement, there is frequently pallor and a cyanotic hue, and in some instances there is an actual decrease in surface temperature.

TREATMENT

In a previous publication,[11] the treatment of intravascular venous thrombosis was considered under the following classifications: (1) prophylaxis; (2) conservative therapy, and (3) radical therapy. No attempt will be made here to discuss these in detail, as they have been adequately reviewed previously. Of the prophylactic measures, the most important are: (1) hydration; (2) mobilization; (3) respiratory stimulation; (4) prevention of increased abdominal tension; (5) application of heat; (6) the administration of sodium thiosulphate; (7) hirudinization, and (8) heparinization. The significance of preventing dehydration lies in the fact that it increases the viscosity of the blood and thus favors thrombosis. As previously emphasized,[7] circulatory retardation is one of the most important precipitating factors in thrombosis. For this reason, any condition which tends to produce circulatory retardation should be combated. The quiescence of a patient following an operation is likely to decrease cardiovascular activity. In such cases, early postoperative mobilization is an important prophylactic measure. Patients should be instructed to move their extremities frequently. Also, following an operation there is a tendency towards diminished respiratory activity. This may be due to pain occasioned by movement of abdominal muscles and by increased intra-abdominal pressure due to constricting bandages or to ileus. For these reasons, the patients should be instructed to take deep breaths frequently during their waking hours and every attempt made to avoid tight dressings and to prevent the occurrence of ileus. The application of heat in the form of a heat tent to the lower part of the abdomen is considered a significant prophylactic measure. This is due not only to its beneficial effect on the tone of the intestine, but also because it produces vasodilatation of the peripheral vessels. For this reason, the tent should be large and should cover the entire lower portion of the body so that the lower extremities also receive the heat.

Sodium thiosulphate has been reported to be of value in the prevention of thrombosis. A test designated as the test for plasma clotting index is used to determine patients who are potential clotters, and if a high plasma clotting index is found, 10 c.c. of a 10 per cent solution of sodium thiosulphate is administered intravenously on three successive days. The prophylactic significance of hirudinization and heparinization is based upon their anticoagulant activities. The use of the former has been emphasized in previous publication.[13] More recently, several investigators have presented experimental and clinical studies which show that by the intravenous administration of purified heparin over a period of hours it is possible to diminish the coagulation time considerably.[14] This procedure has been employed clinically in patients in whom extensive surgical operations have been performed and in whom thrombosis is likely to occur.

Once the condition of thrombophlebitis has occurred, some type of conservative therapy should be instituted. The classical method of therapy consists of mobilization and elevation of the extremity. This is based upon the rationale of placing the part at physiologic rest to minimize the danger of breaking off of an embolus and to relieve edema by favoring lymphatic flow. Heat is usually applied to hasten the normal involution of the thrombus in periphlebitis; that is, the inflammatory changes. In our experience, however, the best method of therapy consists of procaine hydrochloride block of the regional sympathetics. This method of therapy is based upon the conception that the mechanism of the development of clinical manifestations in thrombophlebitis is the initiation of a vasomotor reflex as a result of impulses originating in the thrombosed venous segment.[15] That vasospasm is one of the most important factors in the production of the clinical manifestations has been clearly demonstrated by clinical and experimental ob-

servations. In animal experiments we have been able to show that localized chemical phlebitis may produce such marked arteriolar vasospasm that practically all peripheral pulsations disappear.[16-18] It was also found that this mechanism is the result of vasoconstrictor impulses originating in the involved segment and transmitted over the sympathetic nervous system. Interruption of these impulses either by chemical or surgical section prevented the occurrence of vasospasm or restored normal pulsations. The mechanism by which vasospasm produces edema in the involved extremity is based upon the operation of several factors: (1) increased filtration pressure, (2) anoxia of the capillary endothelium, and (3) diminution in the flow of lymph. The increased venous pressure not only affects peripheral volume pulsations, but increases filtration pressure which favors transudation of intravascular fluid into the perivascular spaces. As a result of the arteriolar spasm and evidences of diminished vascularity, a relative anoxia of the capillary endothelium probably occurs, favoring increased permeability and further increasing the transudation of intravascular fluid. It has been clearly demonstrated[19-21] that one of the most important factors in the flow of lymph is the presence of pulsations. As peripheral volume pulsations are markedly diminished in thrombophlebitis, it is logical to assume that there occurs a relative lymph stasis. This results in stagnation of tissue fluids and accumulation of proteins in the perivascular fluids, thus increasing the osmotic pressure of the latter and setting up a vicious circle. It becomes obvious, therefore, that vasospasm plays a most significant role in the production of the clinical manifestations in thrombophlebitis. It is also evident that interruption of the vasoconstrictor impulses by procaine hydrochloride block of the regional sympathetics would break this vicious circle by increasing pulsations, improving circulation and tissue oxygenation, and increasing lymph flow.

RESULTS OF THERAPY

That this occurs is clearly demonstrated by the results obtained from the clinical application of this form of therapy. These have been reported in previous publications and only a brief summary will be presented here.[9,11,16,22,23] A total of forty-one patients have been treated by procaine block of the sympathetics. Probably the most dramatic result of this form of therapy is the prompt and permanent relief of pain, usually within fifteen minutes to one-half hour after the block. Of the 41 patients, 35 (85.4 per cent) were permanently relieved by the first block. Only 6 (14.5 per cent) required a second block for the permanent relief of pain. Another striking result of this form of therapy is the rapid subsidence of fever. Of the 41 patients, 25 (60.9 per cent) were fever-free in forty-eight hours or less. Only two patients had fever longer than a week and this was due to other complications. Complete subsidence of edema occurred within four days or less after treatment was begun in 50 per cent of the cases and within five to eight days in 30 per cent. In only two patients did edema last as long as twelve days. Of particular significance in the evaluation of this form of therapy is the duration in the hospital and the follow-up results. Two-thirds of the patients were discharged from the hospital on the fourth to the eighth day after treatment was begun and 23 per cent from the tenth to the twelfth days. Only four patients remained in the hospital more than twelve days and this was due to reasons other than those occasioned by the involved extremity. In the follow-up observations on a number of these patients over periods varying from six months to two years there has been no evidence of recurrence of post-phlebitic manifestations.

Procaine hydrochloride block of the regional sympathetics may be performed relatively easily and the technic has been described and illustrated previously.[24] For the lower extremity involvement the

patient is placed in the lateral recumbent position with the affected side up. The skin is prepared over the lumbar area and wheals are made in the skin by intracutaneous injection of one per cent procaine hydrochloride at points approximately two to two and one-half finger breadths lateral to the upper part of the spinous processes of the first, second, third, and fourth lumbar vertebrae. A 20 or 22 gauge needle about 8 to 10 cm. in length is inserted vertically through each wheal until the transverse process of the corresponding vertebra is reached. The direction of the needle is then changed slightly, either superiorly or inferiorly, so that it can project beyond the process and is pointed slightly towards the midline. It is then inserted for another two and one-half finger breadths so that its point impinges against the anterolateral surface of the body of the vertebra in the retroperitoneal space where the lumbar sympathetic ganglia and trunk lie. After aspirating to make certain that the needle is not in a blood vessel, 5 c.c. of 1 per cent procaine hydrochloride solution are injected through each needle.

For the upper extremity the anterior approach is considered more desirable. An intracutaneous wheal of procaine hydrochloride is made in the skin immediately over the upper border and 1 cm. medial to the midpoint of the clavicle. A needle similar to that already described is introduced on a horizontal level with the clavicle and directed posteriorly and medially at a 45 degree angle with the midline until it impinges against the anterolateral surface of the body of the seventh cervical vertebra or at the junction between the seventh cervical and the first thoracic vertebrae, where the stellate ganglion lies. After ascertaining by aspiration that the needle is not in a vessel, 10 c.c. of 1 per cent procaine hydrochloride solution are injected. The presence of a Horner's syndrome, anhydrosis, and increase in warmth of the extremity on the injected side indicate a satisfactory injection.

SUMMARY

1. The frequency and significance of thrombo-embolic phenomena are emphasized.

2. The etiologic factors in intravascular venous clotting consist of two groups; (1) predisposing, and (2) precipitating. These are briefly reviewed.

3. Vasospasm is considered one of the most important factors in the production of the clinical manifestations of thrombophlebitis. The mechanism is the initiation of a vasomotor reflex over the sympathetics as a result of impulses originating in the thrombosed venous segment. As a result of vasospasm there occurs increased filtration pressure, anoxia of the capillary endothelium, and diminution in the flow of lymph, setting up a vicious circle. Interruption of the vasoconstrictor impulses by procaine hydrochloride block of the regional sympathetics breaks this vicious circle by increasing pulsations, improving circulation and tissue oxygenation, and increasing lymph flow.

4. The results obtained by procaine hydrochloride block of the sympathetics in 41 cases of thrombophlebitis are presented. These results clearly demonstrate the superiority of this method of therapy.

5. The technic of procaine hydrochloride block of the sympathetics for the upper and lower extremities is described.

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PLASMA THERAPY*

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We are using the term plasma to define the fluid portion of blood separated without clotting. This substance has recently come into widespread usefulness in clinical medicine and surgery because of several inherent virtues. In the first place, plasma can be pooled and stored for indefinite periods. This makes it an ideal perfusion fluid, since it is immediately available without the drawbacks of typing and cross-matching. It may be transported over long distances without deterioration and its usefulness is quite obvious therefore in military practice and in those emergencies that follow in the wake of natural disasters.

Since the question of the relative safety of using untyped and unmatched plasma will occur to those who are contemplating its use, a few observations on our experience will be set down. We have been using, now for almost seven months, pooled incompatible plasma almost exclusively. It is our practice to type all donors and record their group together with their Kline reaction on the blood bottle. This is done mainly for pooling purposes, for we have not, except on rare occasions, given type-specific plasma.[1] It would indeed be a great handicap if this virtue of universal acceptability were denied plasma as is whole blood.

Titrations run by us on pooled plasma have given repeatedly low values for Alpha and Beta agglutinins. The suppression of agglutinins by the simple process of pooling has been quantitatively studied by Levinson[2] who found uniform isoagglutinin suppression in pooled serum, in spite of the fact that the contributing sera possessed high titers. These facts indicate that the neutralization mechanism of tissues and sera provide a wide margin of safety for the recipients' cells.

The plasma used by us has been prepared by simple sedimentation. Aspiration is performed after twenty-four to one hundred and twenty hours with a simple three-way petcock syringe, details of which are described elsewhere.[1]

PHYSIOLOGIC ASPECTS

Plasma may be considered as a liquid suspension of three proteins, namely, albumin, globulin and fibrinogen. Of these three, albumin remains the smallest in molecular size but the greatest in colloid osmotic effects. Total protein values for plasma range from 6.5 to 8.5 gm. per 100 c. c. Fibrinogen is intimately connected with the clotting mechanism, while the other two are important in the part they play in stabiliz-

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ing the osmotic pressure so that adequate balance between tissue fluids and plasma can be maintained in the capillary circulation.

The regeneration speed of the blood proteins, albumin and globulin, is a slow but constant process. This is in direct contrast to fibrinogen[3] which appears to be replaced quite promptly. The present ease of availability of citrated plasma has overcome the former need for an adequate and easily administered protein.

Several years have now passed since the introduction of banks for the preservation of whole blood. It is now recognized that certain changes are effected by storage, which decidedly impair the usefulness of this material. A definite diminution in the prothrombin levels together with a like loss of platelets and white blood cells is noticed.[4] More serious is an elevation of plasma potassium. The diffusion of potassium has been found to be considerable by Scudder,[5,6] Bull and Drew.[4] They have cautioned against the use of overaged preserved whole blood in those patients whose excretory powers are already compromised. In severe hemorrhage and shock it is the part of prudence to refrain from using aged blood. It is entirely conceivable that inattention to these facts may account for very serious transfusion effects.

The progressive deterioration of preserved whole blood is contrasted with the apparent stability of citrated plasma.[5, 6, 7] Scudder has made careful studies of the electrophoretic pattern of plasma proteins after the method of Tiselius[8] and others[9] and has found very minor changes in the various fractions after as much as fifty-three days of refrigerated storage. He demonstrated distinct changes in unrefrigerated specimens. It may be concluded that plasma is an ideal universally acceptable substitute for whole blood, being a safe and rational material for the treatment of shock and other indicated conditions.

The importance of fluid and electrolyte balance in the treatment of surgical and medical conditions is widely appreciated. Reliable methods for the determination of water and salt balance are available in most hospitals. With the present understanding of the potassium factor in shock it is very important to pay particular attention to sodium balance. Scudder believes that adequate available sodium helps maintain normal balance between intracellular potassium and extracellular sodium. A diffusion of potassium into the cells results from an adequate concentration of sodium. These may be important factors in the prevention of secondary shock.

The understanding of electrolyte balance is very basic to the construction of any rational plan for the usefuluess of plasma. It is fortunate indeed that the importance of the electrolytes is so widely appreciated. Plasma is a valuable vehicle for the convenient restoration of physiologic equilibrium and it is better than coincidence that there are now available simple methods for both the accurate appraisal of electrolyte balance, total proteins[10, 11] and plasma volume.[12] By making use of these laboratory procedures a rational scientific adjustment of body fluids can be effected.

MEDICAL INDICATIONS FOR PLASMA

Plasma has a field of usefulness in gastroenterology, in certain restricted cardiac states, and in occasional nephritic or nephrotic conditions.

In gastroenterology the indications for its use are found in various nutritional edemas. There is the situation where the intake of protein is inadequate either from starvation or other causes. These exogenous nutritional edemas are corrected by diet or plasma infusions. The latter is considered only if operative procedures are contemplated or the individual is in an extreme cachectic condition. The same type of edema is frequently seen also in those states where dietary restrictions have been impaired, due to administration of large amounts of crystalloid solutions with consequent protein depletion. Naturally the frequency of occurrence of these complications will depend on the attention paid to protein and electrolyte levels. In a like manner are other nutritional complications that have their beginnings in certain endogenous

states such as is found in the liver insufficiency of cirrhosis. We have seen remarkable effects from large infusions of plasma in these states.

Hemorrhagic gastrointestinal states such as hemorrhagic gastritis, bleeding gastric or duodenal ulcer, and ulcerative lesions of the large bowel are benefited by plasma therapy. We have found low protein values in the conditions enumerated and have noticed most remarkable recoveries following pooled plasma infusions as will be described in our group of clinical cases. The explanation of these hypoproteinemic states may be laid at the door of both chronic blood depletion and also inadequate dietary intake, caused from patients' apathy toward food, or in the diarrheic states to the inability of the gastrointestinal tract to digest properly and utilize the foods ingested.

Postoperative obstructions after a surgical operation of the gastrointestinal tract have been described by such men as Ravdin,[13, 14] Jones and Eaton.[15, 16] Tissue edema due to hypoproteinemic states may actually mimic a technic defect in the anastomosis.[14] It is evident that these complications occurred in those patients with latent edema, not grossly visible before operation, but obviously visible after excessive electrolyte administration with a consequent loss of more blood protein. Mecray, Bardin and Ravdin[17, 18] have also shown that the delay in gastric emptying can be charged up to tissue edema, easily corrected by plasma infusions. Small bowel motility is similarly affected.

A noteworthy contribution to the understanding of the relationship of altered protein levels in intestinal obstruction has been made by Fine, Hurwitz and Mark.[19] In experimental intestinal obstruction in animals they have found a fall in plasma volume sufficient to account for the animal's death. They have observed a remarkable change in plasma volume after decompression. It appears that distention is a very important factor in plasma loss. Their experiments have shown that the intravenous administration of electrolytes does not prevent plasma loss but that injection of equal or small amounts of plasma maintains the plasma volume. This, together with decompression, appears to be the ideal way of correction of this imbalance. Obstructive distention of the large bowel is not accompanied by plasma loss.

Plasma transfusions have a place in the treatment of severe infection much the same as whole blood or serum. Where the indications do not call for red blood cells, plasma serves as an excellent medium for the infusion of valuable protective antibodies. Tatum[20] reports the giving of plasma until the red blood cell count drops to 4,000,000, then giving whole blood to bring the count back to normal, continuing from there with plasma as long as needed. Severe infection with its concomitants of fever and increased metabolism call for replacement of valuable protein. The losses sustained in pus and urine need to be replaced to prevent more serious complications. As Tatum[20] has remarked, "Maintainence of plasma proteins is much less difficult than the restoration."

The content of specific antibodies has been reported by Strumia[21] as remaining stationary in the plasma for at least thirty-two days. The activity of complement begins declining after three or four weeks.

Use of pooled lyophile serum in the prophylaxis of infectious diseases has been described by McGuiness, Stokes and Mudd[22]. The drawbacks with serum are frequent occurrence of severe reactions. Tatum[20] and Hill[23] mentioned the usefulness of pooled convalescent plasma. It deserves wide clinical trial as it is both safe and entirely free from reactions.

Plasma has a place in the treatment of severe bacillary dysentery. The extreme dehydration and fever depletes body protein and cuts down blood volume. Adequate attention to electrolytes and protein levels will help in overcoming some of the dire effects of this disease.

Some observations on the edema associated with cardiac cases have been made by Muntwyler.[24] Cardiac cases with edema have a tendency to a lowered colloid osmotic pressure and plasma protein. They found

that the colloid osmotic pressure in these cases was at a higher level than in cases of nephritis with edema.

The edema of nephritis was shown to be consistently accompanied by a lowering of both plasma protein and plasma colloid osmotic pressure.[24] However, it is pertinent to remark that complete disappearance of edema may occur on a salt-free diet, even though the plasma proteins are below the values associated with edema. However, the tendency of edema will remain unless this deficiency is overcome. The oliguria and edema of nephrosis are similarly tied up with low plasma protein values. Remarkable instances of diuresis have been reported by the use of lyophile plasma and serum in the treatment of these conditions by Aldrich.[25]

We are presenting three case reports taken from a large series collected over a period of nearly seven months. At a later date we intend to present a detailed analysis and evaluation of the use of plasma in this group.

CASE NO. 1

H. K. was admitted to Touro Infirmary for treatment of peptic ulcer. He was put on a milk and cream regimen, plus the use of an antacid preparation, magnesium trisilicate. He responded well to treatment with a clearing up of most of his presenting complaints.

Because of the persistence of red blood cells and pus cells in the urine a urologic consultant was called. Cystoscopy and bilateral pyelography was performed. A complete anuria developed which persisted for about seventy-two hours. There was an elevation of the non-protein nitrogen and the patient appeared quite toxic. Total proteins amounted to 4.96; the eyelids and face appeared puffy. In addition to the usual measures against anuria, the patient was given 1200 c. c. of plasma as a hypodermoclysis. The blood protein the next day rose to 5.13. By coincidence or otherwise the patient began to urinate. This is only cited as a case of hypoproteinemia complicated by anuria; no definite relationship is claimed.

CASE NO. 2

W. S., a lad of twenty years, was admitted to the hospital with a diagnosis of ulcerative colitis. He was tried on the dietary restrictions customarily used in the treatment of this disease, but showed no particular response. He had from five to fifteen bowel movements per day. He grew toxic gradually, eventually running a temperature between 101 and 104 daily. Because of difficulty in maintaining his nutrition he was placed on intravenous alimentation. He made good response, growing a little stronger. Exactly seven days later a very obvious swelling of the face, eyelids and forearms because manifest, also some in the sacral region. Total protein at this time was 5.11 mg./100 c. c. blood; red blood cells 4,250,000 and hemoglobin 80 per cent. The patient received 300 c. c. of diluted plasma at this time, at a later date another 300 c. c. Signs of hypoproteinemia promptly disappeared. Patient is now well, having been in a full remission for over 20 weeks.

CASE NO. 3

X. A., aged 52, was admitted to the hospital with a diagnosis of gastric hemorrhage. He appeared ghostly white, the face was swollen, the eyelids were puffy. He was put to bed, given nothing but cracked ice by mouth. Blood studies on admission showed red blood cells 1,670,000; hemoglobin 55 percent Talquist, white blood cells 19,900, with differential of 88 polymorphonuclears and 12 per cent lymphocytes. The blood pressure was 100/60.

Ten days before admission the patient had a pain in the abdomen, more acute after eating. He vomited blood one day before admission and passed black stools. He collapsed for fifteen minutes day after admission.

Twenty-four hours after admission he was given 100 c. c. of citrated plasma diluted with an equal part of 5 per cent glucose in saline. The puffiness and swelling of the face disappeared. He received a total of three more plasma transfusions ranging from 75 to 300 c. c. He showed a progressive improvement and fourteen days after admission had a red blood count of 3,510,000; hemoglobin 72.

COMMENT

Undoubtedly this patient was suffering from the effects of a low blood volume plus a definite hypoproteinemic state. This was promptly corrected by small doses of diluted plasma. What hemostatic effect the plasma played is hard to evaluate. An interesting observation was the marked hematopoietic response apparently elicited by the use of plasma alone. A similar effect has been recently reported.

SUMMARY

A short review of the place of plasma therapy in medicine has been detailed, together with three case reports.

We wish to extend our sincere appreciation to Drs. S. H. Colvin, Jr., pathologist, Paul Milton Goldfarb, R. P. Morrow, Jr., and Robert M. Kimball for their cooperation and helpful aid.

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DISCUSSION

Dr. John Connell (New Orleans): I think this paper was an excellent exposition of the various indications for the use of plasma. I, personally, have had experience with it for about one year at Alexandria, La.; at the Charity institution we maintain a plasma bank. We have given two hundred or more plasma transfusions in the past year. Each day we come across newer and better indications for this type of therapy.

We began therapy with the use of serum instead of plasma. We met no unfavorable results; however, there have been statements in the literature that serum has a slight amount of danger and so we deferred in favor of plasma. I do not believe that serum is dangerous if handled and made up properly. The advantage of plasma is that one can obtain a larger amount of solution. From the mechanical standpoint we use not the gravitation method but the centrifuge, and thus get a maximum amount of plasma from the blood. We have given plasma with a sprinkling of red cells, taking a blood count before administering and find that a small number of cells gives no adverse reaction.

Therapeutically, plasma was first administered for shock. I do not know of anything in the world that works as dramatically in the treatment of shock, either traumatic or secondary. This is most emphatically shown in cases that come under so-called obstetrical emergencies. I know of at least a dozen patients who, I am sure, would have certainly died, whom we saved with the use of prompt plasma medication. There are not many things in our armamentarium with which we can say we have definitely saved lives. To know we have saved a patient from death makes a strong impression on us. We have administered in severe shock and secondary shock, such as in automobile injuries, as much as 2,000 c. c. of plasma. In one case we gave 1,600 c. c. of serum without adverse reaction of any kind. In the whole series of cases seen, only a few have had minor reactions. The reactions have been no more than when giving plain glucose. We think the medium of glucose with the plasma is better than saline.

Using the plasma therapeutically we have come across gradually, more and more extensive use. The field, I think, is just beginning to open as brought out by the many suggestions tonight. We have found it useful, as mentioned in one case by Dr. Katz, even in anemic cases, when impossible to get a blood donor. In secondary anemia, it is definitely stimulating to the bone marrow.

We had an interesting case of aplastic anemia; a man who had had fifty-eight transfusions and was getting to a point where he could not take a transfusion without a severe reaction. I suggested the possibility of using plasma. This has been done and for nine months he has been carried satisfactorily on plasma transfusion every month or six weeks.

An interesting technic has developed in using the red cells. When we come across a patient with severe anemia who does not need plasma we give the red cells to that patient and plasma to the patient who needs the protein content.

I think this mode of therapy is going to be a very important adjunct in our armamentarium along lines not even now investigated and I think we will all use it a great deal in time to come.

Dr. Mims Gage (New Orleans): I would like to ask if the plasma bank he mentioned was not his own private bank, as I have asked for plasma at two of the hospitals and neither one had available plasma.

Dr. Connell has a plasma bank at his hospital in Alexandria which has been in use for over a year. We here in New Orleans should request the various hospitals which we staff to obtain the necessary apparatus for preservation of plasma in order that plasma banks will be available to the medical and surgical staffs.

Dr. D. N. Silverman (New Orleans): For the past six or seven months at Touro and Baptist Hospital we have used this therapy in many patients.

Dr. Ochsner had a patient who lost 2,000 c. c. of blood and in order to keep the man from going into shock and dying we were able to give plasma. Another patient was one Dr. Ambrose Storck had; loss of plasma volume after resection of bowel. We supplied the plasma for that patient and also for numerous others.

In gastrointestinal diseases, biliary dysentery, toxemia, very severe dehydration, where there is no chance of feeding the patient otherwise, we have been able to maintain the protein balance. Certainly in severe cases of chronic ulcerated colitis, we have something that is better than anything that we have had previously.

I was glad to hear Dr. Connell's statement about the red blood cells, which we have been using in a few instances of secondary anemia.

Dr. Katz (In closing): I will simply make one addition, that is, in regard to the usefulness of the red blood cells after the plasma has been aspirated. Dr. Connell mentions that he resuspends the red blood cells in saline and gives it to anemic patients after proper typing and cross matching. We have had no experience with this work. However, we have also made use of red cells in the treatment of secondary anemia. It is our practice to pool the cells and store them in 500 c. c. vacuum bottles. The cells are withdrawn from the bottle and injected intramuscularly with procaine. From present indications it appears that a hematopoietic response is elicited. We are continuing this work and feel that it holds some promise.

PEPTIC ULCERS

WITH SPECIAL REFERENCE TO NON-SYMPTOMATIC TYPE AND CASE REPORTS OF RUPTURE INTO PERITONEAL CAVITY AND INTESTINAL HEMORRHAGE*

W. J. NORFLEET, M. D.
SHREVEPORT

I realize that the phrase "non-symptomatic ulcers" may be considered superfluous by some of the medical profession, and others may even doubt the existence of such a condition; however, to those of us who have been confronted with these conditions they are not only real, but severely test our diagnostic acumen as well as our ability to treat them satisfactorily. Naturally, in presenting this subject it is necessary to understand that there are several variable factors, such as the accuracy of the history, and the individual's response to pain or discomfort, which must be carefully evaluated. Unfortunately at present the presenting symptoms are not those of the classical ulcer syndrome but are complications of peptic ulcer, such as intestinal hemorrhage and hematemesis or melena or perforation with peritonitis. Therefore, to discuss this subject intelligently it is essential to review as many cases of this type as possible which were non-symptomatic prior to the perforation or hemorrhage, and later were proved to be ulcers either by operation, radiologic findings, or autopsy. In reviewing the literature I not only find many conflicting statements but some interesting facts which are worthy of reporting. As yet a great deal is unknown about peptic ulcer, but it is to be hoped that in the future more cases of this type will be reported so that eventually a review of the literature combined with scientific investigation may help explain the occurrence, seasonal variation and many other puzzling questions pertaining to this subject.

INCIDENCE

It is commonly known that peptic ulcers occur in all races, and in all parts of the

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world, but statistics reveal that this disease is more common in certain countries than in others and in certain tropical regions it is rarely encountered. Both sexes are subject to the disease but it is more commonly found in the adult male during the second, third and fourth decades of life than in the females of the same age group. In contrast to this, Denys Jennings[1] studied the statistics of acute perforated ulcers in several countries and races over a period of 150 years and discovered that during the nineteenth century these occurred most frequently in young females. He reports that out of every six cases reviewed, three were in young women below the age of 20 years, one in an elderly woman, one in an elderly male and one in a young male. Also he found that as this century progressed the disease seemd to be on the increase and continued to affect females in about the same proportion, but about the beginning of the twentieth century there was a sudden shift in its incidence, as the disease began to appear more frequently in adult men. The ratio since 1900 has been about six or eight adult males to one woman.

A peptic ulcer may occur as a clinical entity, or may be found as a complication of other diseases. The classic signs, symptoms and even x-ray findings are familiar to all physicians and help establish the diagnosis in a large per cent of the cases, but often there are patients who have neither the usual symptoms, signs nor positive x-ray findings of peptic ulcer and it is this group of persons (though small in number) who are the most perplexing and in whom the condition is often undiagnosed until there is a perforation into the peritoneal cavity or an intestinal hemorrhage. As modern diagnostic methods reveal that most ulcers occur in the duodenum or the vicinity of the pylorus, as would be expected the acute perforated ulcers are located in these areas. Ross and Letourneau[2] report that out of 228 patients with perforated peptic ulcers who were admitted to the Montreal General Hospital in a fourteen year period, 84 per cent were in the duodenum and the other 16 per cent occurred either in the pylorus or in the pre-pyloric area of the stomach. Of this series, 91 per cent of the perforations were in the immediate vicinity of the pylorus and there were four patients with double perforation.

Odom and Debakey[3] found that out of 2,607 patients with peptic ulcer who were admitted to the Charity Hospital in New Orleans from 1929 to 1938 inclusive, there were 211, or approximately 8 per cent, with acute perforated ulcer. They conclude that over this period of time the general incidence of ulcer increased about one and one-half times and acute perforations have increased about seven times. Of the group, (211 cases) there were 29 patients, or 13.6 per cent, who gave no previous history of gastric distress. Eusterman and Morlock[4] report that out of 1,089 verified cases with hematemesis or melena there were 17 persons (1.5 per cent) without the least vestige of previous gastric or digestive distress, and another 24 (2.2 per cent) who, upon repeated questioning, revealed only mild or vague histories of gastric disturbances. Therefore, they concluded that in a total of 3.7 per cent of these patients hemorrhage was the first symptom of existing pathology in the duodenum. Thus, considering the facts, first, that only about 8 per cent of peptic ulcers perforate and 13.6 per cent of these are non-symptomatic, and second, that only 20 per cent of duodenal ulcers give rise to gross hemorrhage and that in 3.7 per cent duodenal hemorrhage is the first indication of pathology, there is justification in the assumption that non-symptomatic peptic ulcers are not infrequently encountered and many times are not suspected until autopsy. A review of autopsy statistics verifies this conclusion. Therefore, physicians are confronted with serious gastric or duodenal pathology which does not give rise to symptoms.

PATHOGENESIS

The pathogenesis of peptic ulcers still remains a debatable subject in spite of the numerous theories and hypotheses which have been advanced. Time will not permit a discussion of all these, but there are some which I wish to mention as they may have

considerable influence on the development of this disease. Jennings,[1] after his extensive review of the occurrence of perforated ulcers for many years, came to the conclusion that certain environmental factors and hereditary tendencies which are frequently overlooked play a very important role in the development of peptic ulcers. Also a recent investigation by the Royal College of Physicians of the 1940 British Expeditionary Forces in France seems to show that environmental factors predispose to a recurrence of the disease, as about 92 per cent of men with diagnosed ulcers had symptoms years before enrollment in the army.

For years investigators have successfully produced chronic ulcers in experimental animals, but the results have been questionable for various reasons. DeBakey,[6] in his series of experimental ulcers, tried to control all possible environmental and dietary elements, and has shown quite conclusively that certain alterations of the usual alkaline duodenal juices will produce chronic peptic ulcer in a large percentage of the operated animals.

Virchow was the first to advance the theory that peptic ulcers resulted from a disturbance of the circulation of the stomach, with infarction and ulceration. This theory has been discussed by many observers for years, some claiming that there was a local spastic disturbance and others that there was a general systemic disease. That the circulatory system is an important factor in the genesis of the peptic ulcer has been demonstrated rather clearly by Boles, Riggs and Griffith[6] who analyzed 161 autopsy cases in the Philadelphia General Hospital, which showed acute ulceration of the gastric mucosa. These cases were selected from the younger age group, with the average age of 33 years, in order to avoid the chronic vascular changes of elderly people. Some of these ulcers were perforated, others grossly macroscopic and others were microscopic. In some cases there were numerous lesions, in others there were varying stages of development and some areas showed healing of the acute mucosal lesions, but in all cases by differential staining, they demonstrated a definite disturbance in the deep layers of the musculature. For convenience sake, the cause of death, which was varied, may be divided into four groups; namely, cardiovascular disease, 77 cases; metabolic disturbance, 52 cases; anemia or blood dyscrasia, 14 cases; and cerebral disease, 18 cases. Thus, there was a direct vascular disturbance in the first three instances and a possible vasomotor disturbance in the cerebral cases, and as a general systemic condition was present in all cases, it suggests that the vascular disturbances found in the deeper structures of the stomach and underlying the acute mucosal lesion were a result of a general systemic disease and not a local reaction. As all of the ulcers found in this series were acute lesions, the question may arise whether they were caused by the oral administration of certain irritating medicines or by vomiting or straining, but medicines and vomiting would not produce circulatory disturbance and degenerative changes of the muscular layers of the stomach beneath all of the ulcerations, even under the healed lesion. To prove that similar lesions were present throughout the body, studies were made of other tissues, such as the liver, spleen or brain, and similar areas were found; therefore, it would seem that this condition was due to a general systemic circulatory disturbance and not to any local or focal cause.

In addition to the above, it is possible that certain disturbances of the endocrine glands play important roles in ulcer formation. It is interesting to know that Jennings,[1] in his review which showed acute perforations predominating in young women, found that in no instance was there an acute perforation in a pregnant woman. Also Sandweiss[7] et al. found that many women who had ulcer symptoms were entirely relieved of all symptoms after becoming pregnant and remained symptom free until delivery. In addition, they demonstrated that in a group of experimental animals in which alkaline duodenal juices were diverted from the usual course by operative procedures, administration of the

anterior pituitary-like hormone prevented the formation of ulcers. Wolfe[8] in his textbook on endocrine disturbances, devotes several pages to the discussion of certain endocrine disturbances and their possible role in formation of peptic ulcers.

CASE NO. 1

R. J., aged 16 years, school boy, had a past history which was unimportant except for childhood diseases. He had exemplary habits, did not use alcoholic drinks nor tobacco. Since early childhood the diet was closely supervised by parents and only most nourishing foods were taken. Previous to onset of present illness he was in perfect health; took part in normal school activities. On March 5, 1937, the patient attended school as usual, had a light lunch at 12:30, and at 3:30 p. m., while riding in an automobile from school, was stricken with intense abdominal pain. When examined first at four o'clock in the afternoon, thirty minutes after the onset, he was found to be a normal male, well developed and muscular; temperature normal, pulse rate slightly accelerated; heart and lungs were normal; abdomen flat with slight rigidity. The pain apparently was all over the abdomen. He was moved to the hospital and examination of the blood showed 19,500 white cells, 86 per cent polymorphonuclears and 14 per cent small lymphocytes. The urine was negative. At 5:30 the abdomen was more rigid. When the abdomen was opened the appendix was acutely inflamed and a ruptured ulcer on the anterior surface of the pyloric ring was found and closed. Patient made an uneventful recovery and since has had no signs or symptoms of returning ulceration.

CASE NO. 2

J. B. B., aged 55 years, business executive, had the following past history: For years the patient had an essential hypertension which had caused little or no inconvenience. Repeated examinations failed to reveal any evidence of disease; however, about six or eight months before the onset of last illness he began to show some evidence of myocardial degeneration and was kept on a very strict diet and often spent considerable time resting in bed. His business activities were curtailed and he used alcoholic drinks sparingly, but continued to smoke excessively. A few months before the onset of the last illness he was examined at Scott and White Clinic and nothing was found except the hypertension with myocardial degeneration. On December 20, 1938, patient was put to bed with attending nurses because of dizziness and increase in blood pressure. For the next few days he ate sparingly and was very comfortable. Early on the morning of December 30, 1938, after having taken practically nothing to eat the previous night, he was awakened with intense pain in the upper abdomen. When examined at 5 a. m. the pain seemed to be the result of gas in the colon and an enema, and hypodermic of luminal gave him relief, but at 7:30 a. m. the pain returned and was much more severe. At this time there was beginning rigidity of the abdominal muscles and patient was moved to the hospital where a blood examination showed 14,000 leukocytes with 86 per cent polymorphonuclears and 14 per cent lymphocytes. Blood Wassermann and blood chemistry were normal, as well as kidney function. X-ray examination showed free air under the diaphragm. A few hours later a laparotomy was done and a perforated ulcer on the first portion of the duodenum was found and closed. For a few days the patient made satisfactory progress but after 72 hours there was a definite myocardial weakness which progressed until death.

CASE NO. 3

P. G., aged 30, was an electrician who complained of being unable to concentrate and dizziness. He gave a history of having a primary lesion five years before examination, otherwise the past history was negative. The physical examination revealed little of importance except some loss of weight. Blood Wassermann was four plus. Spinal fluid examination showed increased pressure, cell count 26, globulin increase with four plus Wassermann. He was given intensive antiluetic treatment over a period of four years, with short periods of rest. During the last year it was noted that following injection of either arsenical or bismuth preparations there was marked capillary dilatation of the face and exposed surfaces, but his general condition was good and he continued to work as an electrician. There were no complaints of gastric distress. In October, 1940, while working in a nearby town, he was suddenly seized with severe epigastric pain in the night and few hours later a laparotomy revealed a ruptured ulcer in the pyloric end of the stomach on the anterior surface, which was closed and patient made an uneventful recovery.

CONCLUSIONS

From the foregoing discussion and case reports it will be noted that non-symptomatic types of peptic ulcers are not uncommon. The first patient, a young student apparently in excellent physical condition, developed this condition which ruptured before there were any symptoms to indicate its present. Other patients each had circulatory disturbances and cerebral involvement which preceded the present condition. Peptic ulcers may occur as clinical entities or as complications of other diseases; therefore, this type of condition offers serious complications to all members of the medical profession, regardless of

their specialties. At present from the evidence it seems as if certain types of conditions such as circulatory disturbances, cerebral diseases, metabolic diseases, blood dyscrasias and perhaps certain endocrine disturbances are particularly prone to play important roles in the formation of these ulcers.

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DISCUSSION

Dr. J. E. Knighton (Shreveport): Dr. Norfleet has pointed out some most interesting things in the discussion of this subject. In his general discussion of the subject I think it was most interesting to note that during the 19th century records indicate that the problem of peptic ulcer was more common in women. Since that time, it is a well recognized fact that men are much more frequently victims of peptic ulcer. It may be that prior to the 20th century, we might recall from historic records, women were essentially the burden bearers, but as time has advanced men have borne more of the hardships of life and develop more peptic ulcer symptoms and conditions.

I think these cases that Dr. Norfleet presented are rather interesting. Of course, it is hard to understand why the young patient should have developed an ulcer. At least, it is hard to understand any background that might predispose to ulcer in his case. However, in the other cases there are conditions, just as he has suggested, so frequently associated with these tragedies in connection with peptic ulcer. Take, for instance, the hypertensive case, the arteriosclerotic patient, no doubt there were circulatory conditions that might predispose to the ulcer. But why they should not have presented symptoms is hard to understand. I can recall numerous cases, as I am sure you can, with severe hemorrhages in patients who did not give a history of digestive disturbances prior to the onset of hemorrhage. And I can recall, also, cases that after the hemorrhage had subsided and the patient passed over enough time that you would feel safe in having x-ray examinations, yet the x-ray would fail to show any indications of the ulcer. I am sure all have observed that. Of course, hemorrhage does not always have to come from an ulcer. The patient might have esophageal varices, or something else that would produce hemorrhage.

In a general way, I believe a good many of the patients who deny any history of digestive disturbances may really have had symptoms. You know there are a great many people who think everybody has indigestion. They think that is normal. You may ask them if they have had any stomach trouble. But as a matter of fact a great many people have had the ordinary milder digestive disturbances which they think are normal; they do not think of that as being abnormal, but they think everybody has those same symptoms.

Dr. Ernest H. Gaither (Baltimore): We have all had this experience with asymptomatic ulcer, wherein you witness the catastrophe of a perforation or hemorrhage without a history of any previous symptoms of ulceration. In these cases the condition at times is entirely missed. There is a great deal of truth in what Dr. Knighton said, that if you inquire carefully into the history in quite a few patients you will find that they have had dyspeptic symptoms, not necessarily harrowing pains, but simply what the patient thinks is normal in the way of mild, dyspeptic symptoms such as fullness, distress and discomfort, going on for probably a number of years. I have seen a large number of cases of perforation and of hemorrhage wherein these complications were the first manifestations of a pathologic lesion in the digestive tract. The latest case was a few weeks ago. This was a very intelligent man, and I think you can depend pretty well on the history. He was 47 years of age, a metallurgical engineer. He was in the central part of the business section when, as he explained, the next thing he knew he was in bed at a hospital. Well, the history was that he fell into the door of a store with a severe hematemesis. That man assured me that he had never experienced the slightest evidence of any dyspeptic symptoms before the catastrophe occurred. Students ask you, "Why do these patients go along for years with peptic ulcers and yet never have dyspeptic symptoms?" The answer is simply that there is no explanation. How can you explain that any more than the large number of individuals who come to autopsy with gallbladder pathology, with stones? And yet, we can inquire and we find that patients who had no evidence of dyspeptic symptoms and no recent attack are endeavoring to keep from you the history of previous dyspeptic symptoms. I think the subject is of overwhelming importance because with individuals who have never had dyspeptic symptoms and who have a

perforation, the true state of affairs may not be suspected unless one possesses the knowledge which Dr. Norfleet has so graphically presented to us in his splendid essay.

Dr. D. N. Silverman (New Orleans): Since we cannot anticipate the horrible catastrophes that follow non-symptomatic ulcer, then we must contend with the complications. Hemorrhage and perforation do not hold the terrifying possibilities that they formerly did. And now, I come to the subject in which I have been interested for the last year, namely, the employment of blood plasma. It is immediately available for the treatment of perforation and hemorrhage, both of which put the patient in severe shock and cause early death. It was said that hemorrhage which continued for forty-eight hours was usually fatal. A few years ago, I published a paper in which I reported the use of continuous drip transfusion of whole blood to maintain blood pressure and blood volume, preventing the collapse and death of the patient. This whole blood caused severe reactions and serious symptoms, such as edema of the lungs. At the present time, when a patient has hemorrhage or perforation, in a few minutes you can reach into the reservoir of blood banks, which should be present in all hospitals, small and large, and give the patient sufficient fluid to maintain blood volume until nature is able to take care of the hemorrhagic area and the shock which the patient immediately goes into on perforation. The use of large or massive doses of blood has been shown by Marriott to be of little avail, because the rise of blood pressure is slight and at best only temporary. We need to pay no attention to the anemia or loss of the red cells in hemorrhage because it is the blood volume which counts. The patients are unable to nourish for days or long periods of time, and with the use of blood plasma we have a substance which maintains the fluid balance, the water remaining in the blood vessels, rather than having it extravasate into the surrounding tissues, and the necessary nutrition maintained, as I have just mentioned.

This is simply an appeal for the wider use of blood plasma and for its early employment in these acute cases of hemorrhage and shock.

Dr. W. J. Norfleet (In closing): The subject of peptic ulcer has always and still continues to be interesting to me and perhaps with the changing economic and world conditions, the disease will be more frequently encountered. I am particularly anxious to see what effect, if any, the present mobilization of the armed forces will have upon the incidence or frequency of this disease, and, as I will be assigned to active duty in the La Garde General Hospital, probably I will have an opportunity to study this phase of the subject more intensely.

INFLUENZAL MENINGITIS

THE SUCCESSFUL TREATMENT OF A CASE IN AN INFANT

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The recovery from influenzal meningitis in infancy is extremely uncommon. In the records of the New Orleans Charity Hospital for the past five years there have been 57 cases of proved influenzal meningitis with two recoveries. Of these cases 45 occurred in children under the age of three years, and in this group there have been no recoveries with the exception of the case being reported. It is this relatively frequent occurrence of influenzal meningitis in young children and the extremely high mortality in this age group which prompts us to report this case with apparent complete recovery.

CASE REPORT

The patient, a white male infant of eleven months, was brought to the New Orleans Charity Hospital on November 6, 1940. He had been having chills with fever to 103° F. for four days and had also had some vomiting. For two weeks prior to this acute illness he had had a cold. The child's mother noticed that the baby had kept its head "drawn back" for three days. On the day of admission the child had first been taken to a local hospital where a spinal puncture was done. The fluid was found to be turbid and the smear showed organisms which were believed to be gram-negative diplococci. Because the hospital lacked a contagious unit, the child was referred to the Charity Hospital in New Orleans as a case of meningococcal meningitis.

The past medical and family histories contained nothing of importance in relation to the illness. The patient had been breast-fed since birth. He had also been given cod-liver oil, orange juice and pureed foods. He had never been a healthy baby, having had frequent colds and attacks of diarrhea. He had had no childhood diseases.

Examination revealed an acutely ill, undernourished male infant of eleven months of age. Temperature was 102° F., pulse 140, respiration 32. The child, although appearing drowsy, was very restless, whimpering and moving his arms and legs

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about constantly. The neck was stiff and the child showed some opisthotonus. Kernig's and Brudzinski's signs were not present. The reflexes were within normal limits. The pupils were equal and reacted to light. The pharynx was slightly injected. The tympanic membranes were not inflamed. The heart and lungs were clinically negative.

On admission the white cell count was 12,250 with 88 per cent polymorphonuclear neutrophils. The urine was negative. Spinal puncture was repeated and revealed cloudy fluid under a pressure of 260 mm. of water. The dynamics were normal. A smear made from the spinal fluid showed gram-negative organisms of questionable morphology and for this reason, after a negative skin test, the child was given 10,000 units of meningococcal antitoxin intramuscularly. The following day the smear was reported by the pathology department as unquestionably showing influenza bacilli. Culture confirmed this report.

The patient was immediately put upon sulfapyridine in 10 grain doses at four hour intervals, the dose being calculated at 4 grains per pound of body weight per day. After three days this dose was diminished by half. After one week, oral administration was discontinued because of vomiting and the failure to produce a high blood level of the drug. The child was then given two clyses daily of 200 c. c. of 0.5 per cent sodium sulfapyridine monohydrate in normal saline. These clyses were continued until convalescence was well under way. Spinal fluid levels of the drug ranged between 2.2 and 7.0 mg. per cent.

Spinal punctures were done twice daily and as much fluid removed as would drain freely. Two-thirds of the amount of fluid removed each time was replaced by anti-influenza bacillus serum, which was allowed to run into the spinal canal by gravity. The remainder of the 30 c. c. ampule was then give intramuscularly. Transfusions of 100 c. c. each of citrated blood were given at four to five day intervals.

During the first three days of treatment the patient showed a downhill course. The neck became more rigid, vomiting was frequent and the child was extremely restless. Temperature ranged between 99° F. and 102° F. At the end of the first week the baby showed considerable improvement, the neck was only slightly stiff and he was able to sit up and play. The spinal fluid appeared clear, two sterile cultures were obtained and the cell count fell to 20 per cu. mm.

On the tenth day after admission the child developed a generalized urticarial rash over the entire body, and the temperature, which had not exceeded 100.6° F. for several days, rose to 102° F. The rash was believed to be a serum reaction. Because of the doubtful value of serum in these cases and the large amount the child had already received, serum was discontinued, daily spinal taps being done for drainage only.

Within the next week, the patient's original symptoms and signs reappeared. The spinal fluid became hazy, cell count rose to 640 per cu. mm. and cultures were again positive for *Hemophilus influenzae*. Serum therapy was reconsidered in spite of the risk entailed. At this time it was decided to attempt to enhance the value of the serum with fresh adult serum to provide complement, according to the method of Ward and Fothergill[1] and Fothergill.[2, 3] A skin test revealed a two plus positive reaction to the serum. Serum was given in desensitizing doses until 20 c. c. had been given intramuscularly. Following the daily spinal punctures, the fluid removed was replaced by 15 c. c. of influenza serum and 5 to 8 c. c. of fresh human adult serum. The child at no time experienced any untoward effects from these procedures.

The patient improved steadily, the spinal fluid again became clear and cultures were sterile. The child was afebrile within three days and remained so until his discharge one month later, with the exception of one evening rise to 101° F. After four negative cultures the spinal fluid showed a positive growth for two days, unaccompanied by any clinical manifestations. The cultures were then sterile and the cell count less than ten the remainder of his hospital stay.

Sulfapyridine clyses were reduced to one daily on the thirty-fifth hospital day and all therapy was stopped on the fortieth. The child was discharged on the fifty-second hospital day apparently quite well.

Communications from the patient's mother within the following five months state that the child has been in good health in the interim. He walked at fourteen months and at the present age of seventeen months is able to say numerous words.

CONCLUSION

A case of influenzal meningitis in an infant with apparent complete recovery is presented. The patient was treated extensively with sulfapyridine and influenzal antiserum. He received a total of 60.5 grams of sulfapyridine, 36.5 grams of which were given subcutaneously. Forty-eight spinal punctures were done and 1108 c. c. of spinal fluid removed. Two hundred and sixty five c. c. serum were administered intrathecally and 195 c. c. intramuscularly. Five hundred and twenty c. c. of blood, as transfusions, were given. In spite of the extensive serum

and chemotherapy, the urine and blood picture at no time showed any abnormalities.

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ANOMALOUS VEIN ENCROACHING ON THE FIFTH LUMBAR ROOT AS A CAUSE OF SCIATIC PAIN

A CASE REPORT*

IRVING REDLER, M. D.†
AND
GILBERT C. ANDERSON, M. D.†
NEW ORLEANS

Intraspinal lesions as a possible cause of sciatic pain have been intensively studied during recent years and their clinical, neurologic and radiologic characteristics are now well established. The great majority consist of herniations of the nucleus pulposus, often associated with hypertrophy of the ligamentum flavum. Hypertrophy of the ligamenta flava unaccompanied by other lesions, and spinal cord tumors are less frequent causes. Still more infrequent causes are varicosities or the presence of anomalous veins about the nerve roots. For this reason there seems justification for the presentation of the following case report, in which an anomalous vein, probably arising from the anterior epidural vein, was the cause of the syndrome.

CASE REPORT

Mrs. N. K., a white female, 28 years of age, entered the orthopedic outpatient dispensary of Charity Hospital of Louisiana at New Orleans August 28, 1940, complaining of pain in the lower back which radiated down the left thigh and which had been present for about six months. In February, 1940, the patient had slipped on the floor and had injured her right ankle and back. Almost a week after the fall the pain in the lower back, which had followed the injury immediately, began to radiate down the posterior aspect of the thigh as far as the popliteal region. Still later it radiated down the antero-lateral aspect of the leg to the foot. It became increasingly severe with the passage of time, assuming a continuous, aching character and being aggravated by sitting, bending, coughing and sneezing. Rest in bed, strapping, and the use of a corset failed to give relief. Some three months after the original injury the patient noted an awkwardness of the left leg, particularly when she danced, and eventually the leg felt heavy and as if it had to be dragged.

Physical examination revealed a well developed, slightly obese white woman, in apparently good health. The general examination was negative. When the patient stood upright a slight list of the trunk to the left was evident. There was no spasm of the erector spinae muscles, and no appreciable atrophy of the thigh or leg was observed. Laségue's sign was markedly positive on the left. There was local tenderness about the left sacroiliac joint and along the course of the sciatic nerve. The patellar and Achilles reflexes were present, equal and active on both sides. A small area of anesthesia to pin prick was present over the middle third of the antero-lateral aspect of the left leg.

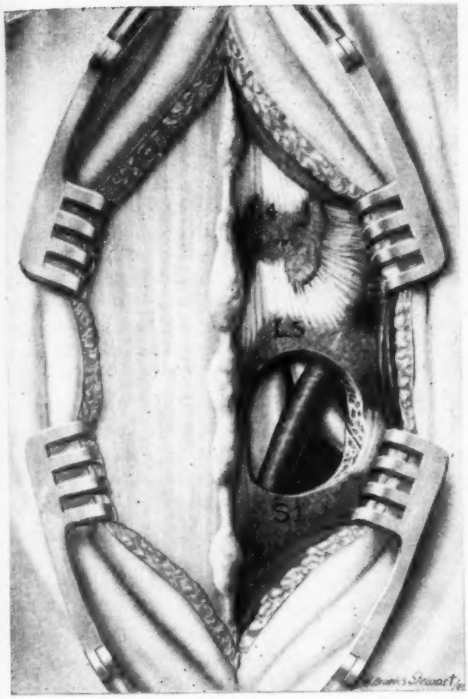
Urinalysis and blood Wassermann reaction were negative. Roentgenologic examination of the lumbosacral spine failed to disclose any abnormality to account for the patient's complaints.

Neurosurgical consultation was requested September 11, and the patient was advised to enter the hospital for myelographic studies and possible laminectomy. Fluoroscopy, after the intraspinal injection of 5 c. c. of lipiodol at the third lumbar interspace, revealed free movement of the column of opaque material in the spinal canal, and no evidence of a filling defect. The films taken following the fluoroscopic examination also revealed no abnormalities.

Despite the negative results of these studies, laminectomy was carried out October 9, on the basis of the persistent severe symptoms and the positive neurologic findings. Portions of the fifth lumbar and first sacral laminae were removed under general anesthesia, the neural arches being left intact. After the ligamentum flavum, which was of normal thickness, had been removed, the exposed dura was retracted and the fifth lumbar root was exposed. The root itself appeared normal, but overlying it was a large anomalous vein, about 3 cm. in diameter. This vein was isolated, ligated, and excised, and several smaller veins about the root were coagulated. The root was not sectioned. No herniation of the nucleus could be found. The dura was opened and the lipiodol removed by suction and drainage, after which intradural inspection of the root showed it to be normal. The dura was sutured and the wound closed in

*Read before the Orleans Parish Medical Society, March 24, 1941.

†From the Departments of Orthopedics and Surgery of the School of Medicine of Louisiana State University and Charity Hospital of Louisiana at New Orleans.



layers. External immobilization was not considered necessary.

The postoperative course was uneventful except for transitory anuria and paraesthesia of the lower extremities. The patient was symptom-free when she left the hospital November 8, 1940. When she was examined in the outpatient dispensary January 16, 1941, she had no pain or disability and had resumed all her previous activities.

COMMENT

A survey of the literature confirms the infrequency of anomalous veins and varicosities as the cause of sciatic pain. Varicosities were found in only four of the 203 laminectomies performed at The Mayo Clinic[1] on the diagnosis of herniation of the nucelus pulposus, and Bradford and Spurling[2] reported only one instance in 60 consecutive laminectomies performed on the same diagnosis; in the latter instance a plexus of veins surrounded the root sleeves of the first and second sacral nerves on the affected side. Ramirez Corria[3] described a similar case in which myelograms revealed a bilateral filling defect opposite the intervertebral disk between the fourth and fifth lumbar vertebrae. At operation bilateral varicosities, which apparently arose from the anterior epidural venous plexus, were found compressing both fifth lumbar roots medially. Coagulation of the lesion resulted in complete recovery.

A case reported by Mixter,[4] in which an anomalous vein was found, is almost identical with the case reported in this communication. A white male, 28 years of age, was suddenly seized with low back pain following a violent coughing effort. For two years thereafter he had severe attacks of sciatic pain associated with subsequent paraesthesia in the affected region. Neurologic and myelographic studies were negative. Exploratory laminectomy from the first to the fifth lumbar vertebrae was performed in an effort to relieve the pain. A large vein was found lying on the left posterior aspect of the cauda, apparently following the course of the fifth root. It was isolated, divided between ligatures, and removed, and the relief obtained immediately proved permanent.

SUMMARY

A case is reported in which intractable sciatic pain, resembling the clinical picture of herniation of the nucleus pulposus, was caused by a large anomalous vein encroaching upon the fifth lumbar root. Myelographic studies with lipiodol had failed to reveal evidence of an intraspinal lesion and the diagnosis was made at operation. Removal of the vein was followed by complete recovery. A similar case reported by Mixter makes clear that this lesion, although rare, can be responsible for sciatic pain, and that symptomatic relief can be anticipated following its removal.

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DICUSSION

Dr. Anderson: I think this case illustrates the fact that we are coming more and more to consider sciatica or sciatic neuritis, or what you please to call it, as a syndrome indicative of some underlying pathology rather than as a clinical entity in itself. There may be some cases that are primarily and purely idiopathic but I believe in the vast majority of cases we would be able to find some factor which would be readily demonstrable as the cause of these pains, if they could be studied to their ultimate conclusion.

In this particular case, as the doctor brought out, we were more or less at a loss to understand why these symptoms were present and I must say that, in my limited experience, I have not been able to demonstrate a rupture in the presence of a definitely negative myelogram such as he had here; however, we were so thoroughly convinced this woman had a ruptured disk that we had the study repeated and even after the second report, which was again negative, we were willing to explore her, after having explained the possibility of a perfectly negative exploration. We found an anomalous vein overlying the root and apparently compressing it and although it is not readily explainable, how or why such compression would be responsible for her symptoms, they were relieved following the section of this vessel.

As stated, it is very similar to the condition reported by Mixter who also said it was very difficult for him to explain why that particular vessel caused that syndrome which disappeared after removal of the vessel. Where that vein came from, is hard to say. As brought out, it may have become intradural higher up. We had only a short portion of the vessel exposed and it was difficult to get the ligatures around it; between which it was severed and removed.

When a patient is relieved after operation, most surgeons are willing to rest on their laurels. It has been some time since this operation; there has been no recurrence and I have no reason to think there will be.

LARGE SOLITARY ABSCESS OF THE KIDNEY*

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MERVIN E. FATTER, M. D.†
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The numerous articles on acute staphylococcal infections of the kidney, that have appeared in the medical literature in recent years, give evidence that the medical profession is coming more readily to recognize the clinical picture presented by the various types of coccal renal infections which develop in the cortex of previously healthy kidneys.

The clinical picture is totally different from that presented by bacillary infections. In the coccal infections, the urine is almost always macroscopically clear and negative, although microscopic examination of the urine may reveal some red blood cells, a few pus cells and an occasional cocci, whereas in the bacillary infections examination of the urine always reveals pyuria and bacilli.

While solitary abscess of the renal parenchyma is not often seen and probably less often recognized, however, there have been reported a comparatively large number of multiple cortical abscesses and carbuncles of the kidney, similar lesions having in all probability etiologic factors identical with those of the solitary abscess.

This case of solitary kidney abscess was thought to be sufficiently interesting to report not only because very few have apparently been recognized preoperatively but also because it presents rather interesting pyelographic demonstrations of diagnostic importance, and of the rapidity with which a diseased kidney may resolve following operation.

CASE REPORT

A white female, single, 20 years of age, entered the urologic service of the Independent Unit of Charity Hospital on May 16, 1940. She complained chiefly of pain in the right loin and fever which began 10 days before admission to hospital. She appeared acutely ill. The patient gave a history of having had boils nine months previous to admission. Physical examination disclosed rather marked tenderness on right side of upper abdomen below costal margin. No definite mass could be palpated. There was slight tenderness in the right costo-vertebral region. Palpation in the left loin disclosed no abnormalities. The urine was negative for albumin and sugar but showed occasional white blood cells, and no red blood cells. The stained

*Read before the scientific meeting of the Orleans Parish Medical Society, January 27, 1941.

†From the Independent Unit of Charity Hospital of Louisiana at New Orleans, Urological Service of Dr. Henry J. Lindner and Staff.

smear was negative for organisms. Culture of urine showed *Esch. coli*. Wassermann was negative.

Her temperature on admission was 102° F., white blood cells 17,700 with 81 per cent polymorphonuclears, red blood cells 3,960,000; hemoglobin 80 per cent. Four days after admission the patient was cystoscoped and the bladder found to be apparently negative. Ureteral catheters passed to both kidneys with ease. The urine specimens from the bladder and both kidneys showed smears and cultures negative. Indigo carmine injected appeared in three minutes with good concentration from both kidneys. Pyelograms of right kidney at this time were not satisfactory from a diagnostic viewpoint. A tentative diagnosis of abscess of the kidney was made at this time.

Serologic agglutinations were negative for typhoid, paratyphoid and undulant fever. As the patient's condition did not appear to be as acute as on admission, it was determined to treat her symptomatically with armed watchfulness.

Ten days after admission the temperature was 102.4° F., with a white blood count of 19,200. There was a definite mass in the right upper quadrant of abdomen. Pyelogram, retrograde, of right kidney showed definite separation of calices and flattening of the kidney pelvis. At this time, a diagnosis of associated perinephric abscess was made and it was decided to operate and explore the right renal region without further delay. This was done by means of the usual oblique kidney incision. The perirenal tissues anteriorly were found to be thickened and pale and adherent to the anterior surface of kidney. No free pus was found anywhere. However, on freeing the anterior surface of the kidney from the thickened, inflammatory perirenal tissue, a point was reached about the mid-portion of the anterior surface of the kidney that was more adherent to perirenal tissues. When this was freed by gauze dissection a large amount of pus was seen to come from the opening in the perirenal tissue. A hemostat was inserted into this opening and opening enlarged, whereupon about four ounces of pus were evacuated. Material was taken for culture. The anterior surface of kidney showed collapsed wall over abscess crater which could be palpated. What happened here was this, the kidney abscess perforated the renal capsule and emptied its contents into the perirenal tissue. Digital exploration of opening in perirenal tissue revealed a completely walled off cavity.

A small soft rubber catheter was placed in abscess cavity in perirenal tissue and two cigarette drains were inserted down to kidney abscess opening, after which the wound was closed in layers.

The patient's temperature became normal the sixteenth postoperative day and remained so until discharged from the hospital twenty-nine days after the operation.

Before leaving the hospital the patient was cystoscoped and the urine found to be clear and negative to cultures. Indigo carmine test appeared

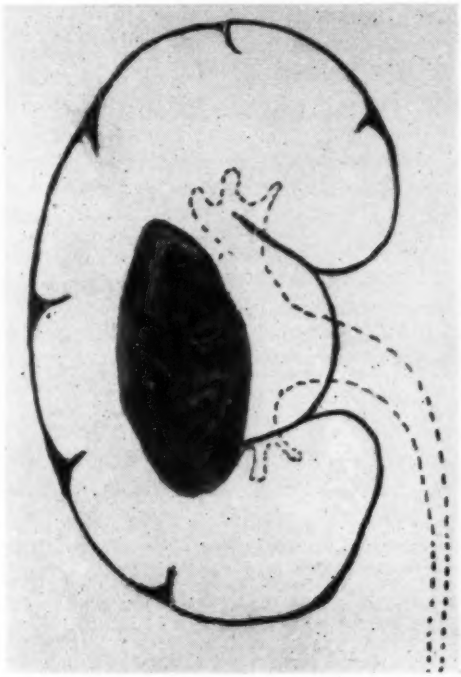

Fig. 1. Approximate position and comparative size of abscess of right kidney.

Fig. 2. Right pyelogram showing marked compression of renal pelvis and separation of calices.

in three minutes with good concentration. Retrograde pyelogram showed apparently normal renal pelvis and demonstrates the seeming rapidity with which a diseased kidney may resolve following operation. Culture of the pus obtained at the time of operation showed *Staphylococcus aureus.*

We had the opportunity again to see the patient six months after operation. She was in excellent health and had gained weight.

ETIOLOGY

The *Staphylococcus aureus* is the most frequent invading organism, although any of the other staphylococcal strains may be and have been responsible. The portal of entry for the invader is usually the skin. In most instances the patients give a history of having had some pre-existing lesion such as boils or other type of skin infection. However, upper respiratory infections, paronychia, infected wounds and osteomyelitis may be the primary factor.

SYMPTOMS

The characteristic symptoms of this disease are a rise in temperature with or without chill, with pain in the lumbar region. The kidney usually cannot be felt. There is a definite jar tenderness over the involved kidney. Leukocytosis is always present. Examination of the urine may show little or nothing. There may be some red blood cells in the urine, some leukocytes or a trace of albumin as a result of the febrile reaction, possibly from the affected kidney, possibly from the other kidney. The functional tests of the kidney and blood examination for retention products are most likely to be negative. The value of cystoscopy is to demonstrate that both ureters are patent and that the patient is not suffering from a blocked kidney.

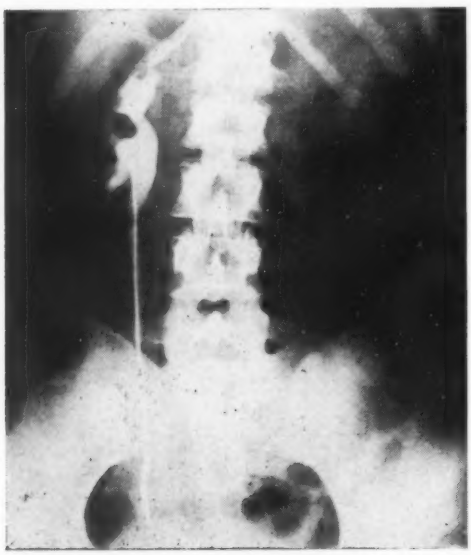

Fig. 3. Right pyelogram, three weeks after operation, showing apparently normal renal pelvis and calices.

Urography may demonstrate a pushing apart of the calices above and below the abscess and a compression or flattening of the kidney pelvis.

Thus, a negative urine together with the signs and symptoms indicating renal involvement and a history of a pre-existing skin lesion should make one suspicious as to the true state of affairs. Of considerable aid, however, is the pyelogram. One looks chiefly for pressure signs such as compression of the pelvis, unusual separation of the calices or displacement of a single calix.

TREATMENT

The treatment of large solitary abscess of the kidney is incision and drainage.

SUMMARY

A large solitary abscess of the kidney is comparatively rare and not often diagnosed preoperatively. We have reported a case in which the pre- and postoperative pyelograms are interesting and significant both from the standpoint of diagnosis and the rapidity with which a diseased kidney may resolve after operation.

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MEDICAL PREPAREDNESS

During the past several months the entire medical profession of the state, those members as well as non-members of organized medicine, has received a questionnaire sent by the Committee on Medical Preparedness for Louisiana, Dr. C. Grenes Cole, Chairman. This questionnaire was sent out in cooperation with the National Committee on Medical Preparedness, and the offices of the Surgeon Generals of the Army and Navy. The questionnaire is not very lengthy nor detailed, and requires only a few minutes to fill out. The information is of great importance in the attempt to organize the profession of the state for any national emergency.

The response has been quite satisfactory, but there are yet many questionnaires that have not been returned. The committee is anxious to have a complete return and asks that all physicians who have not returned the questionnaire do so at their earliest convenience. If the form has been misplaced, write to the Committee on Medical Preparedness, Room 105, 1430 Tulane Avenue, for another copy. Your cooperation in this matter will be greatly appreciated and you will be demonstrating again your willingness to support all matters of national defense and preparedness. Parish organizations are urged to bring the matter to the attention of their members and emphasize its importance. The committee will appreciate all the cooperation furnished it.

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CORONARY AND GALLBLADDER DISEASE

The association and apparent relationship between coronary disease and gallbladder disease has long been known and frequently discussed and investigated. Walsh, Bland, Taquini and White* discuss the problem and the results of their investigations, both clinically and at post mortem. They found 6.8 per cent of 1,000 private patients with coronary disease to have clear evidence of gallbladder disease, and 2.7 per cent more to have peptic ulcer.

Upon examining 2,737 autopsies on persons 20 years of age or older, there were 21 per cent classified as having coronary atherosclerosis (576 patients). There were 456 patients (16 per cent) with abnormal gallbladders and 122 cases (4 per cent) where coronary disease and gallbladder

*Walsh, Bernard J.; Bland, Edward F.; Taquini, Alberto C.; and White, Paul D.: The association of gallbladder disease and of peptic ulcer with coronary disease; a postmortem study, Am. Heart J., 21: 689, 1941.

pathology existed together. In 149 cases (5 per cent) there was definite peptic ulcer.

Gallbladder disease occurred in women (22 per cent) more often than in men (12 per cent). The reverse was true as regards coronary disease, with 37 per cent of males and 24 per cent of the females.

In analyzing and summarizing the results, the authors state that they are in agreement with previous workers who were unable to find that gallbladder and coronary artery disease are closely related, except through the occurrence of an unknown "aging factor." They re-emphasize the clinical truth that a diseased gallbladder or a peptic ulcer may definitely disturb cardiac function, and the cardiac condition may be markedly improved by the removal or correction of a diseased gallbladder or a peptic ulcer. However, disturbed functions in other organs may act in like manner, but disease of the gallbladder and upper gastrointestinal tract have a more profound effect.

The authors conclude that gallbladder disease occurred twice as often in patients with coronary disease as in those with normal arteries; that there was no indication of a significant association of peptic ulcer and coronary disease in the same person; and that the association of coronary and gallbladder disease was due, in part at least, to an unknown "aging factor."

SULFAPYRIDINE AND THE BARBITURATES

There has been some discussion and concern over the possible harmful effects of the combination of sulfapyridine and the barbiturates in the treatment of pneumonia. Many clinicians have hesitated to use these sedative drugs in patients with pneumonia being treated with sulfapyridine. This hesitancy was prompted or increased by the report of Adriani of experiments on rats, showing that the administration of sulfanilamide rendered the rats highly sensitive to barbiturates.

King and Moersch* reviewed 18 cases in which barbiturates in the usual doses had been used as sedatives in conjunction with sulfapyridine. The most frequently used barbiturate was pentobarbital sodium. Only one instance of any ill effect of the combination was found. Even in this case the prolonged hypnosis which resulted could not be definitely proved to be due to any unfavorable reaction of the drugs. The authors conclude that ordinary doses of the barbiturates may be used with safety in patients receiving sulfapyridine or sulfanilamide.

These conclusions are in agreement with the experience of many men who have used sodium phenobarbital, pentobarbital sodium and other barbiturates for sedation, hypnosis and in an attempt to control the nausea often produced by the sulfonamides in the treatment of pneumonia.

MORTALITY RATES

It is interesting to study and reflect upon the information concerning mortality rates among the American people as set forth in the Statistical Bulletin of one of the large life insurance companies†. The record shows that from the first six months of 1941 at least seven causes of death seem likely to establish new minimum rates. These are scarlet fever, diphtheria, pneumonia, tuberculosis, diarrhea and enteritis, appendicitis, and puerperal diseases. What is even more surprising and encouraging is that diabetes, cerebral hemorrhage, and chronic heart disease also seem likely to set new low records.

On the other hand, deaths from motor accidents have increased 26.1 per cent. Each month of 1941 the rate has increased over the same month of 1940. Canada shows the same increase, though the total is smaller.

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*King, William L. M., and Moersch, Herman J.: The combined effects of sulfapyridine and the barbiturates in the treatment of pneumonia, J. Lab. & Clin. Med., 26: 793, 1941.

†Statistical Bull. Metropolitan Life Ins. Co., 22: 5, 1941.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

CALENDAR

October 1. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Hutchinson Memorial Clinic Staff, 8 p. m.
Mercy Hospital Staff, 8 p. m.

October 2. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

October 6. Orleans Parish Medical Society Board of Directors, 8 p. m.

October 7. Eye, Ear, Nose and Throat Hospital Staff, 8 p. m.

October 8. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Touro Infirmary Staff, 8 p. m.
Woman's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.

October 9. New Orleans Hospital Council.

October 13. Orleans Parish Medical Society, Scientific and Third Quarterly Executive Meeting, 8 p. m.

October 14. Eye, Ear, Nose and Throat Society, 8 p. m.

October 15. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Charity Hospital Surgical Staff, 8 p. m.
Clinico-pathologic Conference, Hotel Dieu, 8:15 p. m.
The New Orleans Tuberculosis Hospital Staff, 8 p. m.

October 16. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

October 17. I. C. R. R. Hospital Staff, 12 noon.
New Orleans Dispensary for Women and Children Staff, 8 p. m.

October 20. Hotel Dieu Staff, 8 p. m.
Clinico-pathologic Conference, Baptist Hospital, 8 p. m.

October 21. Charity Hospital Medical Staff, 8 p. m.

October 22. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
French Hospital Staff, 8 p. m.
Catholic Physicians' Guild, 8 p. m.

October 23. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

October 28. Baptist Hospital Staff, 8 p. m.

October 29. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.

October 30. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

October 31. L. S. U. Faculty Club, 8 p. m.

SCIENTIFIC MEETINGS RESUMED IN OCTOBER

The Scientific Essays Committee announces that plans have been formulated for the fall programs, the first meeting to be held Monday, October 13. The meetings will include, as they have in the past, interesting case reports and appropriate unrelated subjects or symposia.

NEWS ITEMS

Dr. Charles J. Bloom taught at the Southern Pediatric Seminar in Saluda, North Carolina, July 21-August 2. Dr. Bloom addressed the Tangipahoa Parish Medical Society on "Recent Advances in Pediatrics" at a meeting of this Society held August 21 at Hammond.

Dr. Julian Graubarth was recently appointed by the American Academy of Pediatrics as state chairman for Louisiana. Dr. Graubarth addressed the Southeastern Medical Society of Alabama at Thomasville.

Dr. M. J. Magruder discussed the civic accomplishments of the Gordon sisters at the recent annual service of the Kate M. Gordon Memorial Association.

Dr. Joseph C. Menendez was recently appointed Director of Civilian Defense in the Fourth Corps Area.

Dr. W. A. Wagner won the thirteenth annual Grand Isle Tarpon Rodeo. Dr. Wagner's catch was 6 feet 8 inches long and weighed 122 pounds.

Dr. Julius L. Wilson was recently elected president of the Tuberculosis and Public Health Association of Louisiana.

During the month of August the Society had the misfortune of losing one of its active members, Dr. J. J. Wymer.

TREASURER'S REPORT

Bank Balance, July 31, 1941	$5,839.19
August Credits	360.47
Total Credits	$6,199.66
August Expenditures	478.64
Actual Book Balance, August 31, 1941	$5,721.02

EDWIN L. ZANDER, M. D.,
Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	

ASSUMPTION PARISH MEDICAL SOCIETY

The Assumption Parish Medical Society held a called meeting August 25 at Napoleonville for the purpose of electing officers and attending to routine business. The meeting was called to order by Dr. H. C. Dansereau, who was the last elected President of the Society, Dr. P. M. Payne, acting as Secretary. The meeting was held in the Office of the Assumption Parish Health Unit, in the Court House. A quorum was present.

Officers elected were as follows:

President: Dr. H. C. Dansereau, Labadieville

Vice-Pres.: Dr. C. S. Roger, Napoleonville

Sec.-Treas.: Dr. P. M. Payne, Napoleonville

Other members present were: Dr. A. A. Aucoin, Plattenville; Dr. H. A. LeBlanc, Paincourtville; Dr. T. B. Pugh, Napoleonville; Dr. J. D. Billeaudeaux, Klotzville.

The last two were present by proxy, having requested Dr. Payne to represent them at the meeting.

After the election of officers, the Society then elected to membership Dr. Julius Daigle, of Paincourtville, who being present expressed appreciation at being elected to membership in the Society.

No papers were read but open discussion was held on various topics of interest. Drs. Dansereau and Roger discussed some of the phases of poliomyelitis. Dr. LeBlanc also spoke of the rarity of typhoid fever and smallpox as compared with former years, and this discussion brought to mind a number of cases of what were at first thought to be typhoid but had finally decided to be typhus fever. This was in years past however.

Dr. Payne mentioned the recent proposal of the State Department of Health to furnish anti-luetic treatment to any physician in the parish regardless of financial status of patient.

There being no other business the Society adjourned to meet again in Napoleonville, in December.

P. M. PAYNE, M. D., Sec.

BIRTH CERTIFICATES

There are a large number of persons of American birth who, because no birth certificate was issued at the time of their birth, have difficulty in establishing their citizenship. Since so many rights and privileges depend upon citizenship it is important that a procedure be evolved which will enable such individuals to receive official recognition of their American origin. Since citizenship is a matter of national as well as of local consequence it is desirable that a uniform practice be adopted by each of our states.

Admission to the armed forces depends on citizenship as does employment in most government positions. Furthermore, several statutes provide that on certain types of restricted defense work citizenship is a prerequisite to employment. It is important in such cases that some uniform procedure be available under which a man can establish his place of birth.

Under a proposed plan, persons who have been unable to secure a regular birth certificate could apply to their State Bureau of Vital Statistics, or other similar official agencies, for a "Delayed Birth Certificate."

They would be asked to submit certain newly prescribed evidence such as hospital records, physicians' records, a record from a local state or Federal census, family Bible record, baptismal or confirmation certificate, a school record, insurance policy, driver's license, marriage license, or similar evidence of date and place of birth.

If a satisfactory evaluation can be made of the evidence submitted, the agency concerned would issue the "Delayed Birth Certificate" which would then have the same force as a regular birth certificate.

All the states have been asked by the Federal Government to cooperate in this procedure.

Mr. Patterson and Mr. Forrestal, it was announced, also have sent a memorandum to all present and prospective Army and Navy contractors and subcontractors, informing them of the proposed new procedure and directing them to accept "Delayed Birth Certificates" as evidence of citizenship.

Their memorandum further states:

"In the event that the state in which the employee or applicant for employment claims birth is one in which the procedure outlined has not been adopted, evidence as required by the manual should be submitted to the employer, and if found to be in accordance with the standards set up by the manual, it is recommended that such employee be retained and that such applicant be given employment. In cases where there is reasonable assurance of citizenship, but adequate documentary evidence

is not immediately available, it is suggested that the Army or Navy plant protection inspector, if available, be consulted, and that a continuance of employment for thirty days be given such employee, or that such applicant be employed for thirty days, pending receipt of valid documentation as required by the manual."

THE RESERVE OFFICER
September, 1941

NEW JEFFERSON DEAN

Dr. William H. Perkins, former Head of the Department of Preventive Medicine, and Director of the Hutchinson Memorial Clinic of Tulane University School of Medicine, has assumed the duties of Dean of Jefferson Medical College in Philadelphia.

Dr. Perkins, a native of Philadelphia, graduated from Jefferson Medical College in 1917. He studied in London and Paris, receiving a fellowship from the Rockefeller Foundation. He organized the medical department of the Siamese school at Bangkok at the request of that government, and served as Professor of Medicine and also as physician to the royal family. In recognition of his service, he received the decoration of the Order of the White Elephant.

Dr. Perkins has been active in medical circles in New Orleans and the state since he became a member of the Tulane faculty. He has been a member of the parish and state medical societies since 1931, taking considerable interest in the affairs of both groups. He served as President of the Tuberculosis and Public Health Association of Louisiana, and as a member of the Committee on Tuberculosis of the State Society; he was to have been Chairman of the Section on Public Health and Sanitation for the 1942 annual meeting of the State Society in New Orleans. Dr Perkins was a member of the Journal Committee from 1937 up to the time of his resignation on leaving the city, and has contributed generously of his time and good counsel in the deliberations of the committee. His many friends and colleagues in New Orleans and Louisiana will miss him and regret his absence from their gatherings.

ANNUAL TULANE CLINICS AND HOMECOMING WEEK

The annual Tulane clinics which have been held for the past few years successfully, this year will be held the week beginning October 20. These clinics represent an intensive graduate medical instruction course which has well repaid those who attended in the past. An interesting program has been arranged for this year. The same general arrangement schedule will be enforced this year as in the past. In the morning at the Hutchinson Memorial and Charity Hospital amphitheater there will be held one hour lectures or dry clinics. A pathologic conference will also be held in the morning and on Saturday morning there will be a symposium on some subject of live interest.

Starting at 1 o'clock in the afternoon there will be a series of twenty minute talks and demonstrations by members of the faculty of Tulane Medical School. These will continue until 4 o'clock.

On Saturday, October 25, the annual football game between Ole Miss and Tulane will be played in the Tulane Stadium. This is Tulane's homecoming game and there will be a large number of alumni in attendance. The week's program will afford not only a chance for the practitioner to review the latest advances in medicine, but will also give him the opportunity of seeing his former friends and classmates. This week will give occasion to Tulane alumni to take a short holiday in which duty may be combined with pleasure.

L. S. U. APPOINTMENTS

Registration in the School of Medicine has been completed and classwork began on Monday, September 15, with a total enrollment of 344. Several new appointments to the faculty are announced.

Edwin Byer has been appointed Assistant in Physiology. Mr. Byer received his A.B. degree at the University of Maine, where he served as an assistant in zoology. During the past year he has been engaged in teaching and research in physiology at the University of Iowa College of Medicine.

Dr. John S. LaDue, who has been appointed Instructor in Medicine, completed his undergraduate work at the University of Minnesota and received his medical degree from Harvard Medical School in 1936. After serving an internship at the Long Island College Hospital in Brooklyn, New York, he returned to the University of Minnesota where he held a teaching fellowship and residency at the University of Minnesota Hospital and completed work for the M.S. and Ph.D degrees in Medicine.

Dr. Wallace Sako, Instructor in Pediatrics, received his undergraduate, medical, and Ph.D. degrees at the University of Minnesota. He later served as Fellow in Pediatrics at that institution where he also completed his hospital training. In the university Department of Pediatrics, Dr. Sako was associated with Dr. C. A. Stewart who recently assumed the headship of the Department of Pediatrics in the Louisiana State University School of Medicine.

Dr. George R. Meneely has been appointed Instructor in Medicine. He received his undergraduate training at Princeton University and completed his work for the M.D. degree at Cornell University in 1937. After serving an internship at Strong Memorial Hospital in Rochester, New York, he was appointed a Fellow in Medicine at the University of Rochester School of Medicine, in which capacity he served for one year. He was then appointed Assistant Resident Physician at Strong Memorial Hospital and concurrently served as an assistant in the Department of Medicine at the University of Rochester School of Medicine. During the past year he held a James Gleason Fellow-

ship in Medicine at the University of Rochester School of Medicine, which post he resigned to accept an instructorship at Louisiana State University.

Dr. John Skogland, Assistant Professor of Neuropsychiatry, received his undergraduate training at Hibbing Junior College and his medical training at the University of Minnesota. His hospital training was received at Gillette State Hospital of Minnesota and in the University of Minnesota Hospitals. From 1937-1939 Dr. Skogland was a fellow in Neuropsychiatry at the University of Minnesota and in 1939-1940, Clinical Instructor in Neuropsychiatry in the same school. During the year 1940-1941 he held a research scholarship at Harvard Medical School and at the time of his appointment to the L. S. U. School of Medicine was serving as Instructor in Neuropsychiatry at the University of Minnesota. In addition to his M.D. degree Dr. Skogland holds M.S. and Ph.D. degrees in Neuropsychiatry from the University of Minnesota.

Dr. William F. Alexander and Dr. E. Morton Bradley, instructors in Anatomy in the School of Medicine, resigned during the summer to accept assistant professorships at the University of Georgia School of Medicine.

Dr. John L. Keeley, Assistant Professor in the Department of Surgery, recently resigned to enter practice in Chicago.

Dr. Merrill W. Everhart, Instructor in Pediatrics, has been granted a leave of absence, having been called to active duty as Captain in the Medical Reserve Corps of the Army. Dr. Everhart has been assigned as Chief Medical Officer of the Port of Embarkation in New Orleans.

VAN METER PRIZE AWARD

The American Association for the Study of Goiter again offers the Van Meter Prize Award of three hundred dollars and two honorable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The award will be made at the annual meeting of the association which will be held at Atlanta, Georgia, June 1-3, 1942, providing essays of sufficient merit are presented in competition.

The competing essays may cover either clinical or research investigations; should not exceed three thousand words in length; must be presented in English; and a typewritten, double spaced copy sent to the corresponding secretary, Dr. T. C. Davison, 478 Peachtree Street, Atlanta, Georgia, not later than April 1.

DOCTORS FOR BRITAIN

The Division of Medical Sciences of the National Research Council has again publicized the fact that doctors are badly needed in Great Britain. There is an urgent and a real need for their services, both in the Royal Army Medical Corps and in the emergency medical service. Physicians who might wish to volunteer for this service should communicate with the National Research Council, 2101 Constitution Avenue, Washington, D. C.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The written examination and review of case histories (Part I) for Group B candidates will be held in the various cities of the United States and Canada on Saturday, January 3, 1942, at 2:00 p. m. Candidates who successfully complete the Part I examination will proceed automatically to the Part II examination held in June, 1942.

MILITARY SURGEONS MEETING

The Association of Military Surgeons of the United States will meet October 29-November 1 at the Brown Hotel in Louisville, Ky. A splendid program has been arranged for the meeting which will be attended by most of the high ranking officers in the regular army.

ALLERGY MEETING

The fourth annual Forum on Allergy will be held in Detroit, Michigan, on January 10 and 11, 1942.

The first annual meeting of the recently formed Mississipi Valley Medical Editor's Association will be held at the Hotel Montrose, Cedar Rapids, Iowa, on the evening of October 1, 1941, during the seventh annual meeting of the Mississippi Valley Medical Society, which will continue through October 3.

Duke University School of Medicine and Duke Hospital will hold a Symposium on Problems of Civil and Military Emergencies on October 16-18, 1941 in the Page Auditorium. A program has been arranged which will include nationally known authorities on their subjects. Also of interest is the fact that tickets for the Colgate-Duke football game will be available to doctors registered at the symposium, provided application is made prior to October 11.

Under the auspices of the American Association of Industrial Physicians and Surgeons, the American Conference on Industrial Health will hold its second annual meeting on November 5 and 6, 1941, at Chicago Towers, Chicago. This organization maintains a public forum for all who are interested in the prevention of disease, injury and disability in industry, and the active supervision and promotion of health in industrial groups.

There is a full-time position open at the U. S. Marine Hospital at Carville for a physician to fill a vacancy for a period of approximately one year, or during the national emergency. The work is wholly on leprous patients.

The position pays $3,200 per annum, less deductions of $50.00 per month for housekeeping quar-

ters, which will be furnished. Applicant must be a citizen of the United States and a graduate of an A-1 Medical College, having two years' internship or two years in private practice.

Communications concerning this position should be addressed to Dr. G. H. Faget, Medical Officer in Charge, at Carville, stating age, marital status (including dependents), education, special training, if any, and experience.

Dr. Thomas J. Healy announces the removal of his office from Thibodaux to 1108 Jahncke Avenue, Covington, Louisiana; he will continue his practice in this new location.

A change in the spelling of the name "Petrolagar" to "Petrogalar" has been announced by the Petrolagar Laboratories. The change is being made in both the product name and corporate name.

Company officials, while pointing out that the adoption of the new spelling does not affect the formula or quality of the product in any way, said that they considered the change advisable to avoid any possible misconception as to the nature of the product.

"Because it has never been the intention of the company to imply that agar-agar was used for any other purpose than as an emulsifying agent, the last syllable of the former name has been altered in favor of the new spelling," officials said. Officials emphasized that no change has been made in the size of the package, price, or formulae and that each of the five different types of the product will carry the new spelling "Petrogalar." The new corporate name is: Petrogalar Laboratories, Inc., and the address remains, 8134 McCormick Boulevard, Chicago, Illinois.

INFECTIOUS DISEASES IN LOUISIANA

The morbidity report of the Section of Epidemiology of the Louisiana State Board of Health showed that for the week ending August 16 the following diseases were listed in numbers greater than ten: 460 cases of syphilis, 38 of pulmonary tuberculosis, 36 of gonorrhea, 16 of cancer, 13 each of malaria and typhoid fever, and 11 each of pneumonia and whooping cough. The typhoid fever cases were pretty well scattered throughout the state, Franklin with four and Morehouse with two being the only parishes reporting more than one case. Two cases of poliomyelitis were discovered in Orleans and one in Grant parish; in Orleans three cases of typhus fever were discovered, as well as two in Iberia and one in Acadia. There was a marked increase in the number of cases of syphilis reported in the next week, there being 677 cases listed; followed by 42 of gonorrhea, 31 of pulmonary tuberculosis, 16 each of cancer and pneumonia, 12 of whooping cough, and 10 of typhus fever. Only eight cases of typhoid fever were reported this week, no one parish listing more than two. Seven cases of poliomyelitis were listed, one of undulant fever, and one of Rocky Mountain fever, the latter from Rapides Parish. For the week ending August 30, syphilis was back down to 455 cases, followed by 40 of pulmonary tuberculosis, 32 of gonorrhea, 15 each of cancer and pneumonia, 14 of malaria, and 11 of typhoid fever. Again the typhoid fever cases were spread through the state, with Lafayette and Ouachita parishes reporting two cases, and the other parishes one. A case of smallpox was discovered in Red River Parish; epidemic cerebrospinal meningitis, one case, was discovered in Orleans. Orleans Parish also reported one case of septic sore throat, but both this case and that of meningitis were imported. Another case of undulant fever was reported this week, this time from Iberia Parish. A still further drop occurred in the number of syphilis cases for the week ending September 6, there being only 237 cases reported. Twenty-five cases of gonorrhea, 18 of pulmonary tuberculosis, 17 of pneumonia, 14 of typhoid fever, and 13 of cancer were the only other diseases occurring in figures greater than ten. Of the eleven parishes reporting typhoid fever, only one listed three cases and two, two cases; the others reported one each. For the thirty-seventh week of the year, ending September 13, syphilis jumped up again to 340 cases. Forty cases of pulmonary tuberculosis were reported, as well as 34 of gonorrhea, 16 of typhus fever, 15 of typhoid fever, 14 of cancer, and 11 of pneumonia. Septic sore throat, two cases, was discovered in Iberia Parish; four cases of undulant fever were discovered, one each in Iberia, Orleans, Ouachita and St. Mary parishes. A case of poliomyelitis was reported by East Baton Rouge Parish.

HEALTH OF NEW ORLEANS

The Bureau of the Census, U. S. Department of Commerce, has reported that for the week ending August 9, there were listed 119 deaths in the City of New Orleans, 73 of which were in the white and 46 in the colored race, and 11 in infants. After the marked drop of the previous week, the number of deaths for the week of August 16 again increased and exceeded that of two weeks ago. There were 172 deaths this week, divided 104 white and 68 negro; of the 25 infants dying, 10 were in the white and 15 in the negro race. This was more than double the number reported in the previous week. A slight decrease was noted in the week of August 23, 163 deaths occurring, of which 89 were white and 74 negro. The infant mortality went down to 15, about equally divided between the two races. The next week, that of August 30, the number of deaths in the city remained about the same. The total number of deaths was 164, an even 100 white and 64 negro people dying during this period. The infants deaths jumped up to 30, exactly three times the three-year average for the corresponding week, with a ratio of two negro babies to one white. For the week of September 6, the last week

for which figures are available, the number of demises was considerably lower. There were 101 deaths reported, 68 white and 33 negro, and 13 infant deaths, nine white and four negro.

MICHAEL EDWARD CONNOR
(1879-1941)

Dr. M. E. Connor died in New Orleans, Sunday, September 7, after a short sickness. For the last eight years Dr. Connor had been port physician for the United Fruit Company; he spent many years in Panama, Ecuador, and Central America prior to coming to New Orleans. He was a member of the Orleans Parish and Louisiana State medical societies.

SOL S. KAUFMAN
(1906-1941)

Dr. Sol S. Kaufman, of Crowley, expired at the age of 34 in Galveston, Wednesday, September 3, after a prolonged sickness. Dr. Kaufman was well known in his home city as a splendid doctor and as an active civic worker. He graduated from the University of Mississippi in 1928, and from the University of Illinois School of Medicine in 1931. After serving an internship at the Charity Hospital, he went to Rayne, where he practiced for five years, then moved to Crowley where he had been established for the last four years.

JOSEPH RIGNEY D'AUNOY
(1890-1941)

Dr. D'Aunoy died September 17 in New Orleans in the fifty-first year of his life. Dr. D'Aunoy graduated from Tulane Medical School in 1913. He was for some years connected with the Department of Pathology which subject he early took up as his life specialty. Subsequently he became Professor of Pathology and Bacteriology at the Louisiana State University Medical School; then he became Dean of that medical school. Dr. D'Aunoy was a consultant to the architects of the building of Charity Hospital and was very largely responsible for the physical make-up and the equipment of the present building. Several years ago D'Aunoy resigned from his position as Director of the Laboratory of Charity Hospital and from his connection with the Louisiana State University Medical School. Dr. D'Aunoy was for many years active in the Orleans Parish Medical Society and State Medical Society.

WOMAN'S AUXILIARY
Louisiana State Medical Society

Greetings to all Parish Presidents:

The fall of the year is fast approaching and with it the resuming of auxiliary activities. Listed below you will find the eight projects which the State Auxiliary will sponsor for 1941-42.

ENTERTAINMENT FOR MEN IN SERVICE
Mrs. Geo. D. Feldner
128 Behan Street
Natchitoches, Louisiana

ORGANIZATION
Mrs. Fred L. Fenno
1630 Napoleon Avenue
New Orleans, Louisiana

RED CROSS
Mrs. F. Creighton Shute
Opelousas, Louisiana

INDIGENT WIDOWS' FUND
Mrs. James W. Warren
470 Audubon Blvd.
New Orleans, Louisiana

INDIGENT PHYSICIANS' FUND
Mrs. John D. Frazar
DeRidder, Louisiana

DOCTORS' DAY
Mrs. J. P. Mauboules
Rayne, Louisiana

CANCER CONTROL
Mrs. N. H. Polmer
2207 Carondelet Street
New Orleans, Louisiana

ANTI-TUBERCULOSIS CAMPAIGN
(Handled by Public Relations Chairman)
Mrs. J. O. Duhon
Lafayette, Louisiana

Your attention is called to the fact that the State Auxiliary is sponsoring two new projects, namely; Indigent Widows' Fund and Entertainment for Men in Service.

The Indigent Widows' Fund is a very worthy cause and, when the method of operation is better known to the parish auxiliaries, will no doubt be regarded enthusiastically. The auxiliaries will recognize in this project the means of fulfillment of a beneficence which should be near and dear to the heart of every doctor's wife: that of lending a helping hand to her sisters who at the moment are less fortunate than herself, giving a little of life's comforts and blessings when most needed, making the heartache and heartbreak a bit less acute and her world a better place in which to live. Can there be any greater philanthropic work in which we as doctors' wives can participate?

The work of the Committee on Entertainment for Men in Service does not include entertainment for men in camps or recreational centers, but rather for those ill and convalescing in United States Government Hospitals. This project offers an almost unlimited field of activity in which all auxiliaries, whether large or small, close or far off, can take part. This work is much needed at the present time and the great amount of good which will result from such an endeavor can readily be seen.

Listed below are a few suggestions which may prove helpful when planning your part in this undertaking.

Supplying the following:
- Cigarettes and tobacco
- Subscriptions to appropriate magazines
- Candy, cake and ice cream
- Games and writing materials
- "Home Town" papers
- Recreation room equipment
- Portable radios.

Arranging:
- Programs of local talent
- Drives for those not confined to bed.

The convalescing soldiers welcome visitors, particularly those who will read to them or participate in games like chess, checkers and cards. Sometimes it is necessary to write letters for sick soldiers; this is a very commendable service. These are only a few suggestions. It is a good idea to visit the government hospital nearest you and ascertain where you can help most. This project should appeal to most of us at the present time when every real American is not only anxious but ready and willing to do his part for national defense.

May I take this opportunity to wish all of you a successful auxiliary year; one crowned with splendid achievement due to the hearty cooperation and untiring efforts of all concerned. Please do not hesitate to call on me at any time that I can be of assistance to you. I am planning to visit all of the parish auxiliaries and am looking forward to this with a great deal of pleasure.

With every good wish for health, happiness and success, I am

Sincerely,
Mrs. Aynaud F. Hebert
President

Respectfully submitted,
Mrs. Jules Myron Davidson
Chairman, Press and Publicity

BOOK REVIEWS

Carlos Finlay and Yellow Fever: By Carlos E. Finlay, M. D., F. A. C. S. New York, Oxford University Press, 1940. Pp. 249. Price $4.00.

This volume is edited by Morton C. Kahn, M. A., Ph. D., Sc. D. of Cornell University Medical College, New York, who notes the renewed interest in yellow fever from the research and public health points of view. Dr. Kahn regards Carlos Finlay as at least a trail blazer and pays a handsome tribute to the U. S. Army Board, composed of Reed, Carroll, Lazear and Agramonte, that studied the transmission of yellow fever. The author, son of Carlos Finlay, considers that the army board brilliantly confirmed the work of his father. This is the general view of Spanish scientists, and indeed of many others; and the author tells us that our own Dr. Matas in association with others established Finlay's birthday, November 3, as the Day of American Medicine. The author's purpose frankly is to correct the misconception of his father's work, work which in part was carried on 20 years before the investigation of the U. S. Army board, and one must agree that a very plausible case is established. In the introduction we are told that Sir Ronald Ross thought so well of Finlay's work that he proposed the latter for the Nobel prize, which recently had been awarded to Ross for his work on the transmission of malaria.

In questioning the value of the work of Finlay much has been made of the alleged lack of identity of the mosquitoes he used with those successfully employed by the U. S. Army board. Of course recent work has shown that other mosquitoes may be effective vectors, at least experimentally, but according to the volume before me the alleged lack of identity is a matter of changed nomenclature. One is bound to be impressed by the opinion of Juan Guiteras, one of the ablest students of yellow fever, who is quoted as saying: "Dr. Finlay proved the truth of his doctrine. If he failed to convince us the fault was ours and not of his prevision."

Carlos Finlay was born of English-French parents in Puerto Rico in 1934, the son of a physician. He graduated in medicine at Jefferson Medical College, Philadelphia, in 1855 where he became a friend of S. Wier Mitchell (and acquired a microscope). Carlos Finlay aparently made the independent observation that cholera might be carried by water. In later life he occupied several important administrative posts, including one as contract surgeon in the U. S. Army. Finlay seems to have inoculated (by means of mosquitoes) 102 persons of whom 11 came down with yellow fever, 5 others were doubtfully successful and 86 were negative.

According to the author recent discoveries in the field of yellow fever research have nullified some of the objections that were brought against Finlay's work when the studies of the U. S. Army Board were published.

So well convinced was Finlay of the soundness of his views of the transmission of the disease that as prophylactic procedures he recommended mosquito screens and antilarval measures,—these over a year before the studies of the Army Board had been completed, but at the same time seemed uncertain as to just how mosquitoes acquired the infection.

The book reviews much of the research carried on by others at the time the mosquito theory was

relatively new, also much of the work of recent years. Noguchi's well-known error in identifying a leptospira as the cause of yellow fever is explained by the statement that Noguchi was working with material from cases of Weil's disease.

The author stresses that Finlay's mosquito inoculations were primarily intended to prove the practicability of immunization.

The last chapter of the text proper is devoted to the consideration of the evidence on the place of origin of yellow fever and the author comes to the conclusion that the data all point to America as the original source of the disease; in contrast with the conclusion of Henry R. Carter who considered the original source probably to be Africa. Considerable attention is devoted to the first U. S. yellow fever commission presided over by Dr. Stanford E. Chaillé in 1879, a commission for which Dr. Matas, then Mr. Matas, acted as secretary. Thirty-six years ago the last epidemic of yellow fever in the U. S. occurred in New Orleans and the likelihood of another ever occurring seems remote thanks to the exact knowledge we have of the disease, which knowledge has pointed the way to readily applied preventive and suppressive measures. One does not need to accept in full the son's appraisal of the father's work to appreciate that Carlos Finlay was an exceptionally gifted observer, and that his work played an important part in the development of the knowledge that has robbed yellow fever of its terrors for many parts of the world. To those interested in medical and public health history anywhere this volume will prove of great value; to physicians and sanitarians of the South it should be of special interest.

G. W. McCoy, M. D.

Abdominal Operations: By Rodney Maingot, F. R. C. S., Eng. New York, D. Appleton-Century Co., 1940. 2 vols., illus. Price $18.00.

The author has given us, in these two volumes, a good summary on abdominal operations. He has very wisely culled from the literature of the past ten years those modern surgical procedures that are considered pretty well established at this time. In addition, of course, he has not lost sight of the many well established surgical procedures that have come down to us from the many years past. In all instances these older, established procedures are brought up to date in every way. The more modern procedures are thoroughly explained, and their merits and demerits well analyzed.

As in all works of this type, the subjects for general consideration are first presented. Thus the proper choice of incisions is adequately discussed. The matter of drainage is appropriately considered. Wound complications are interestingly given; and, in general, he leads up to the sections devoted to diseases of the various abdominal organs and structures in a very acceptable manner. There is scarcely anything of importance to the surgeon in abdominal operations that the author does not adequately discuss.

Diseases involving the stomach, duodenum, spleen, pancreas, gallbladder and bile passages are very interestingly presented, inasmuch as the author appears to limit himself principally to the presentation of the more practical phases of these subjects. The various types of intestinal obstruction are likewise very clearly discussed. Hernias involving the anterior abdominal wall, as well as the various internal hernias that become strangulated, are very well discussed. Diseases involving the small intestines, as well as the large bowel, are not only clearly given, but the methods of dealing with them are, in most instances, well illustrated by splendid pictures. As a matter of fact, both volumes abound with very good illustrations which depict the subjects under discussion.

The writer does not fully agree as regards several policies of the author. For example, it is felt, by the writer, that in some instances the author is perhaps somewhat radical in some of the procedures. The performance of a major surgical procedure upon the stomach, followed by, at the same sitting, another large procedure, such as cholecystectomy, does not meet with the full approval of the writer. However, this is, of course, a matter of individual opinion, and no doubt the author's favorable experiences in such matters, are the things which prompt him to such practice. One of the many nice features of these two volumes is the fact that the author has his references placed immediately after the authors whom he is quoting on that particular subject. This eliminates a long bibliography at the end of each chapter and, in the writer's opinion, is a decided improvement in books of this kind.

Generally speaking, the writer considers these two volumes an excellent addition to our literature. Not only are the subjects adequately discussed, but they are done so in a fairly easy fashion, making the reading of them much of a pleasure. In addition these volumes represent a very good summary of the many contributions to the field of abdominal operations, especially during the past ten years.

Frank Leo Loria, M. D.

Cardiac Classics: By Frederic A. Willius, M. D., M. S. in Med., and Thomas E. Keys, A. B., M. A. St. Louis, C. V. Mosby Co., 1941. Pp. 858; illus. Price $10.00.

Dr. Willius, a cardiologist of note, and Mr. Keys, reference librarian at the Mayo Clinic, have joined forces in producing a magnificent book of great historical interest. Willius has picked out for republication classic works on the heart and circulation. The original paper, or its translation, is preceded by a short biographic sketch of the author. Before practically all of the sketches there is a picture, usually a well-known reproduction of an

etching or a portrait of the man who made the contribution.

Naturally the first selection is from the pen of William Harvey and is his revolutionary research on the movement of the heart and blood in animals, published in 1628. Succeeding this article comes a series of anatomic papers, together with one or two of the physiologic nature. The first clinical paper is Heberden's "account of a disorder of the breast," angina pectoris, and this is followed by the first therapeutic paper, that of Withering on the use of foxglove, written in 1785. From then on outstanding contributions follow each other in chronologic order until present day living authors' contributions are reached. Graham Steell, Aschoff, Keith and Herrick are the only four living authors whose articles are published.

Needless to state, the book is intensely interesting. It is fascinating to read a short account of the life of van Leeuwenhoek, Adams, Corrigan, Laennec, Duroziez, Flint, Traube, Potain, Fallot, Broadbent, Mackenzie, as well as many other men who have made fundamental contributions to the study of the heart and circulation, and then read the article which, in part, is responsible for their fame. The format of the book is excellent. It is printed on glossy paper which reproduces well the illustrations. This is quite a favorable attribute because some of the plates are taken from old cuts which would be difficult to print clearly without such a high grade of paper. Not only those interested in medical history, but any medical man will derive pleasure from perusing this book. It gives one a real thrill to read the original presentation of facts which are now so definitely ingrained in the study of the heart and circulation that they are accepted as a matter of course.

J. H. MUSSER, M. D.

Science and Seizures: By William G. Lennox, M. D., Sc. D. Hon. New York, Harper & Bros., 1941. Pp. 258. Price $2.00.

The author of this excellent work is a distinguished scientist, investigator, and neurologist, and his book "Science and Seizures" is unique in that it collects, correlates, and interprets all of the available data on epilepsy and migraine. There is a fund of valuable and useful information in this volume, and it sheds a brilliant new light on the subjects.

Of special interest and importance is the suggestion that the term cerebral dysrhythmia be used instead of epilepsy. It has been discovered that an underlying abnormality, which can now be demonstrated in practically all patients suffering with epileptic convulsive seizures, is a disturbance of the pulsations of the electrical currents of the brain. It may be that the seizures of epilepsy are due to faulty functioning of certain parts of the brain as is shown by electrical records. On the other hand, the "seizures" of hysteria are due to subconscious impulses or conflicts and they are not accompanied by abnormal electrical waves of the brain. It is very likely that this will lead to the rejection of the old rule-of-thumb method of making a differential diagnosis between epileptic and hysterical seizures, since electroencephalographic evidence is quite distinctive.

While the author believes there is a positive relationship between epilepsy and migraine, he suggests that a thorough and comprehensive inquiry be made to determine the accuracy of his theory. If work with brain waves has the validity which it presently suggests, and if cerebral dysrhythmia is a medical entity amenable to treatment, we may be on the verge of solving large medical and economic issues.

For generations fear, superstition, and ignorance have surrounded victims of epilepsy and migraine. This book of Dr. Lennox gives hope and courage to those suffering with these illnesses, and it is believed that research and eugenics, with intelligent energetic cooperation from the public, will help to solve their problems.

C. P. MAY, M. D.

Medical Nursing: By Edgar Hull, M. D., F. A. C. P., Christine Wright, R. N., B. S., and Ann B. Eyl, B. S. Philadelphia, F. A. Davis Co., 1940. Pp. 588; illus. Price $3.50.

This book aims to impart to the student nurse an understanding of the principles of general medicine, to furnish her with brief yet accurate descriptions of the important diseases which fall within the realm of internal medicine, and to indicate the medical treatment, nursing care, and dietary management of these diseases. Written by an internist, a nurse, and a dietitian, members of the staff of the Charity Hospital of Louisiana at New Orleans, the book ably and amply fulfills its stated aims.

The choice of content is excellent. Nomenclature has been simplified to the utmost. Chapter outlines, topic reviews, headings and sub-headings render almost unnecessary the adequate index. The use of two columns of print to the page, of large clear type, and of boldfaced type for titles of paragraphs makes the material contained exceptionally accessible for ready reference.

Having used this text in a course of medicine for nurses, this reviewer recommends it unhesitatingly.

EDWARD MATTHEWS, M. D.

The Parasites of Man in Temperate Climates: By Thomas W. M. Cameron. Toronto, the University of Toronto Press, 1940. Pp. 182. Price $3.00.

This little volume is as refreshing and sound as it is complete, and demonstrates that an introduction to the animal parasites of man does not require an encyclopedia.

Following a very brief introduction presenting

the author's point of view as a teacher and investigator, the sections covered include the Protozoa, Helminths, Leeches, Arthropods, a seven-page section on Technique, a two-page Bibliography and a short subject Index.

The book is clearly written, neatly printed and is provided with numerous line drawings and photographs. The terminology is on the whole that which is standard with American students of the subject. Few typographical errors have been noted. For the physician, medical student or layman who wishes to have in his library a brief authoritative presentation, Professor Cameron's little volume should provide the answer.

ERNEST CARROLL FAUST, PH. D.

The Story of Clinical Pulmonary Tuberculosis: By Lawrason Brown, M. D. Baltimore, Williams and Wilkins Co., 1941. Pp. 411. Price $2.75.

Lawrason Brown was not only the beloved physician to his patients and a great teacher to the many physicians who came under his influence at Saranac Lake, but also a student of medical history and a bibliophile. His notes, collected for years, on the history of the development of the diagnosis and treatment of pulmonary tuberculosis have been arranged and edited by his widow and friends to make this posthumous volume. Although not the integrated and possibly illustrated work which Dr. Brown might have produced, had he been granted the time, this story of the rise of physical diagnosis, of the introduction of the stethoscope, of the introduction and perfection of x-ray diagnosis, and of the modern methods of treatment, including pneumothorax and surgery, is excellent reading. The references to the stay in New Orleans of the great Austin Flint at the same time that Leonidas M. Lawson briefly graced the chair of Clinical Medicine at the University of Louisiana are of special interest to local medical historians. Much of the material in this book cannot be found assembled elsewhere. It is recommended for the perusal of physicians, medical students, and intelligent laymen. It is a book for the library of all those who listen regularly for rales, study chest plates, or treat lungs by collapse therapy.

J. L. WILSON, M. D.

Accidental Injuries: By Henry H. Kessler, M. D., Ph. D., F. A. C. S. 2nd ed. rev. Philadelphia, Lea & Febiger, 1941. Pp. 803. Price $10.00.

This book contains much valuable information relative to compensation laws. As a reference for the legal and medical profession it should prove invaluable, especially to those interested in disabilities resulting from accidental injuries. It is written so that the layman can understand it without constant recourse to a dictionary.

It is a splendid compend on problems which arise in regard to economic readjustment. The opinions expressed in many places are open to debate, but on a whole it can be taken as a chart made by a student with wide experience and one who has not stinted the time given to research in order that his own usefulness might be increased.

Any one who is interested in compensation work, or who is interested in medical expert testimony, will do well to keep this volume close at hand, not only for ready concise information, but also for the splendid bibliography which is appended to each chapter.

The chapter on physical restoration and vocational rehabilitation is of great importance.

ISIDORE COHN, M. D.

Roentgen Interpretation: By George W. Holmes, M. D., and Howard E. Ruggles, M. D. Sixth edition. Philadelphia, Lea and Febiger, 1941. Pp. 364. Price $5.00.

In the present or sixth edition of this well-known volume on diagnostic roentgenology, the subject matter has been revised and brought up to date and new illustrations have been added. This work has been one of the most popular on this subject for the student, the general practitioner and the specialist.

The authors have included in a relatively small volume a remarkable amount of detail regarding the more common conditions in which the x-ray is of value in the diagnostic study. The first chapter on "Confusing Shadows and Artefacts" and Chapter II on "Anatomical Variations and Development" are comprehensive and include the information which is so necessary before an attempt at roentgen diagnosis is made. The next eight chapters (III through X) cover the various systems and pathologic conditions in which roentgenology is employed. The last chapter deals with fluoroscopic technic and emphasizes the dangers and the procedures and equipment necessary in safe and efficient fluoroscopy.

The text is clear and concise and the illustrations are excellent. Besides the reproductions of roentgenograms, line drawings are valuable in demonstrating clearly the anatomy and pathology involved. This work should be considered an essential by anyone interested in roentgen diagnosis.

J. N. ANÉ, M. D.

PUBLICATIONS RECEIVED

Lea & Febiger, Philadelphia: Trauma and Disease, edited by Leopold Brahdy, B. S., M. D., and Samuel Kahn, B. S., M. D. Manual of Bandaging, Strapping and Splinting, by August Thorndike, Jr., M. D., F. A. C. S. The Foot and Ankle, by Philip Lewin, M. D., F. A. C. S. Textbook of Pathology, edited by E. T. Bell, M. D.